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THE IRON AGE

New York, Thursday, June 3, 1909.

A Study of Electric Furnaces.*

As Applied to the Manufacture of Iron and Steel.

BY CHARLES ALBERT KELLER.†

The application of electric furnaces of the electrode type to the production of metals which must be won, melted or transformed out of contact with carbon, and more particularly the solution of the problem of making steel, created the necessity of so making the conducting hearths or bottoms of such furnaces as not to carburize the liquid metal contained therein.

The conducting hearths of electric furnaces currently used for electrometallurgical products (calcium carbide, ferrosilicon, ordinary ferrochromium, &c.) have from the very first been either made of a rammed mixture of carbon and a binder, or built up with pieces of electrodes; the carbon lining thus formed being connected in various ways with one of the poles of a source of energy, the

ter of great secrecy. When the problem of the electric furnace manufacture of steel became a live one, it created the necessity for the noncarburizing conducting hearth.

On the other hand, it has been known since the practical use of the electric furnace first began that when dealing with products giving rise to a slag (treatment of chrome ores, for example) the regulation of the arc voltage requires that the end of the electrode be kept in this slag or above it, since contact with the metal would at once cause a practically complete short circuit.

It becomes evident then that, given a noncarburizing hearth already in use, the electric furnaces in the older electrometallurgical works were, in principle, all ready

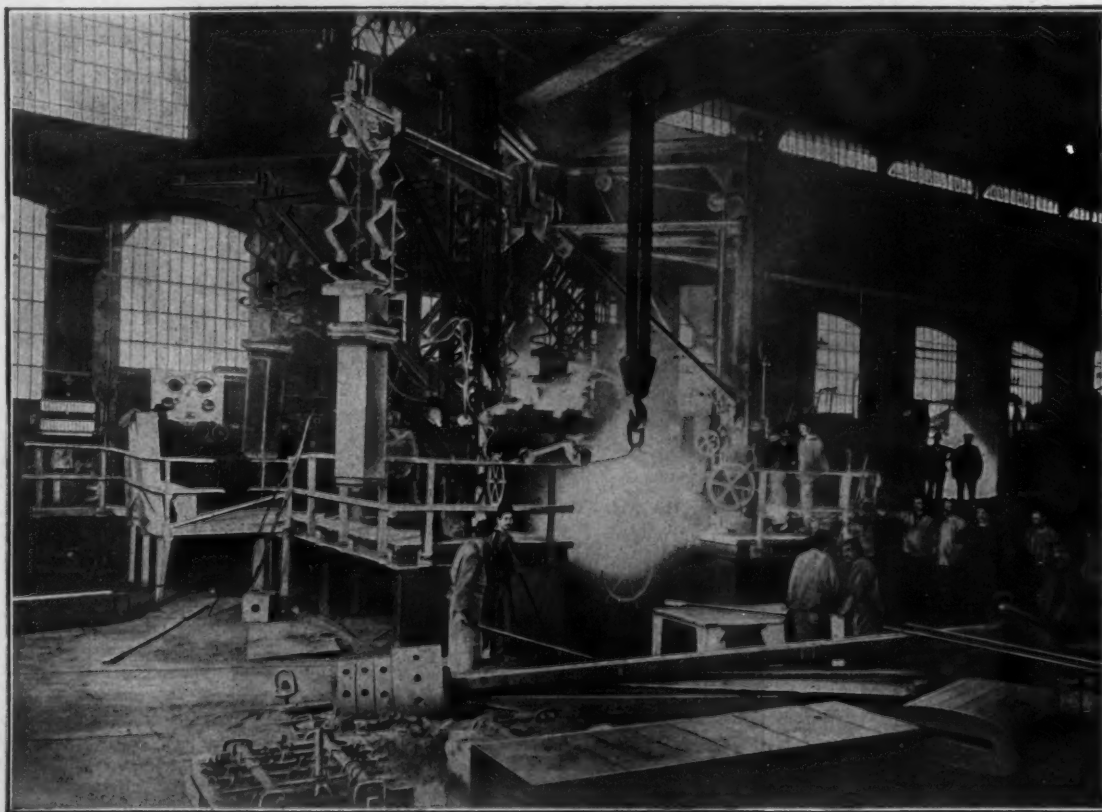


Fig. 1.—The Keller Electric Furnace at Unieux.—Removing the Roof.

other pole being connected to one or more electrodes placed vertically in the furnace.

Although it is only within recent years that the types of furnaces using conducting hearths or bottoms have been worked on the industrial scale with materials other than carbon, it should, however, be borne in mind that the making of a conducting hearth without carbon had been done long before and used at various periods. If no industrial electric furnaces followed this realization it was principally because the construction of a practical metallic conducting hearth, or of a hearth containing a metallic pole, presented greater difficulties than the simple carbon hearth. The need, too, for a noncarburizing hearth had not then made itself felt in the electrometallurgical art, save for some unimportant lines of manufacture, where the methods used were made a mat-

ter for the manufacture of steel, since the upper electrode, because of the requirement of its position electrically when working, cannot of itself effect carburization of the bath in the furnace. Then, to better fit such furnaces for metallurgical operations, it should only be necessary to supply them with details already known and applied to certain electric steel furnaces (charging doors, rockers, rollers for tilting movements, airtight roofs, &c.) which would not introduce any difficulties or hinder the rational study of an electric furnace based upon the use of a conducting hearth to carry the current.

Noncarburizing Conducting Hearths.

At the present time noncarburizing conducting hearths may be divided as follows:

1. Simple conducting hearth:

a. Having the entire furnace bottom of metallic material.

b. Having one or more metallic poles embedded in a nonconducting masonry.

* From a paper read at the Niagara Falls meeting of the American Electrochemical Society.

† Managing director of the Société des Etablissements Keller Leleux, Livet Works, Isere, France.

c. Having the entire bottom of a conducting rammed material.

2. Compound conducting hearth:

I shall here more especially describe a system worked out by myself, consisting of a type of mixed or compound connecting hearth. Nevertheless, to precisely define why this system is thus classified and what differentiates it from the other types, I shall briefly describe the first category and its various subdivisions mentioned.

1. FURNACES WITH SIMPLE CONDUCTING HEARTH:

a. *Entirely Metallic Hearths.*—Several types of furnaces have been designed whose hearth is made of soft steel, cooled by water circulation, but these have not had any important commercial application; they are simply mentioned as a type. The high temperature of the liquid metal does not permit maintaining a metallic bottom, even when cooled, except with an excessive loss of heat and constant danger.

b. *Simple Conducting Hearth, Consisting of One or More Metallic Poles Embedded in Nonconducting Masonry.*—In such furnaces one or more metallic poles are embedded in masonry of the hearth, the current passing through the metal pieces; these conductors are connected at their outer extremities with one pole of the source of energy. This type of furnace is distinguished by the fact that the current is confined almost entirely to the metallic pole or poles if it is divided into several parts by a refractory nonconducting masonry, the masonry surrounding them closely as protection against infiltration by the liquid metal. The first furnace of this type was installed by Siemens, who contrived a furnace composed of a movable vertical electrode connected to one pole of the source of energy, the other pole being connected to an iron bar passed through an opening in the bottom of the furnace chamber. This chamber was surrounded by a heat insulator, and later Siemens adopted a method of water cooling the metallic pole to prevent its destruction. Regulation of voltage was effected by an automatic solenoid regulator.

A very distinct type of furnace was invented by Borchers. An iron casing having a bottom of refractory brick is lined with a suitable material. In the bottom lining is placed a block of steel, into which screws a copper tube, used for circulation of the cooling water for the metallic steel poles. The steel block thus cooled is connected at its lower extremity to one of the poles of the source of energy, the other pole being connected to a vertical electrode, movable for the purposes of voltage regulation. During the working of the furnace the metal which collects at the bottom is tapped from time to time, while the gases escape through the openings in the cover.

In spite of the surpassing electro-metallurgical feats of Siemens, who, at the Electrical Congress at London, in 1880, publicly showed with his metallic pole furnace a cast of about 45 lb. of steel, this type of furnace did not have an immediate industrial future.

The manufacture of steel in such a furnace was not then a live question, and it had to wait until 1905, when the furnace with metallic poles was again revived by Girod, who installed several of them.

c. *Conducting Hearth Obtained by Use of a Rammed Conducting Lining.*—Under this system the hearth does not require a metallic conductor; it is formed of a refractory mixture rendered conducting by the introduction of carbon, or carboniferous material (tar, pitch) into the refractory material (magnesia, silica, &c.) chosen for the mixture. The carbon content of the material is progressively raised at different levels in the depth of the hearth, so as to utilize at the beginning of a run the variations in electrical conductivity of the rammed mixture, according to the content of carbon material. The upper layer of the lining mixture which comes into contact with the steel is formed of a mixture quite low in carbon, so as not to influence the carbon content of the steel. According to the inventors, the crucible having once been heated becomes permanently conducting, no

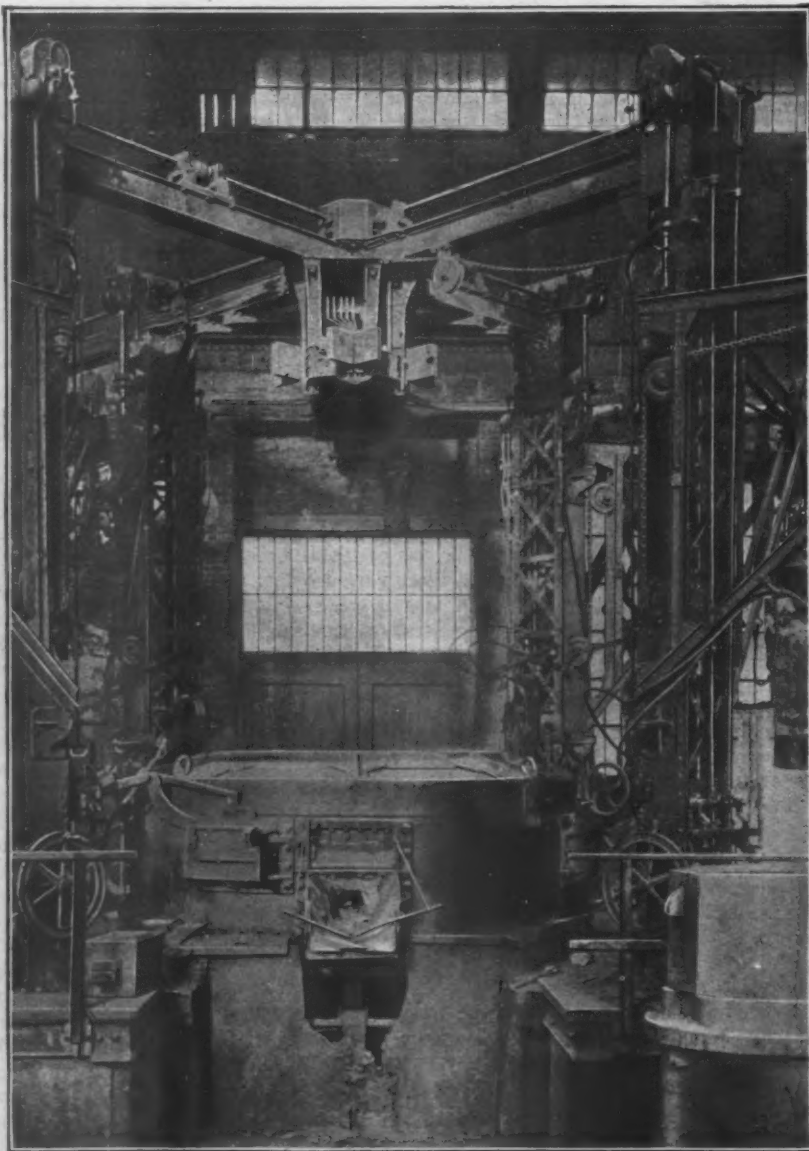


Fig. 2.—The Keller Electric Furnace at Unieux.—End View.

matter what the variations of temperature of the furnace, consequently restarting from the cold state becomes practically possible. The Firminy Steel Works, where this furnace was installed, has constructed up to the present time only one furnace of small capacity.

2. COMPOUND CONDUCTING HEARTH:

I invented and put to industrial use two years ago an electric furnace* of which the conducting hearth is composed of reinforced *pisé* (*pisé armé*) made as follows: Iron bars 1 to 1½ in. diameter, regularly spaced about 1 to 1½ in. apart, are placed vertically and made firm to a metallic plate at the bottom, so as to form a group completely filling the furnace bottom, upon which will

* French patent Ch. A. Keller, No. 393,740, November 4, 1907.

rest the liquid metal. A pisé consisting of a basic material conductor of the second class (magnesia preferred), agglomerated in the ordinary manner, is strongly rammed while hot between each group of four adjacent bars, which thus form by reason of their mechanical strength a sort of mold, permitting considerable compression of the mixture introduced. The pisé thus formed must be driven home by means of a suitable rammer.

There is thus obtained an extremely compact mass or block of compound nature, iron and refractory material, of which the metallic sections are good conductors when cold; when heated the pisé also rapidly becomes a conductor with the high temperature. The whole is surrounded by a metallic casing serving as an envelope which may be cooled by a current of water. The lower plate fastened to these iron bars is connected to one of the poles of the source of energy.

The conducting hearth thus produced makes the starting up of the furnace very easy, because it is uniformly conductive throughout its entire transverse section, by reason of the iron bars placed near together and terminating at the surface of the hearth. The small distance between the bars and the conductivity of the pisé practically places them electrically in parallel for their whole length when the furnace is in full operation. The distribution of the electric current is thus practically equalized throughout the whole section of the hearth.

The lines of flow of current which are produced in furnaces having isolated metallic poles are absolutely removed by the above arrangement, because the electric current from the upper electrode passes through the metal uniformly and also in the same manner throughout the section of the hearth.

The electrical resistance of a conducting hearth constructed as described is almost negligible, because the area of the furnace bottom allows of the use of a large number of bars, representing a total conductivity so high that without considering the conductivity of the pisé the loss is negligible. Furthermore, the use of metallic conductors of small section produces a more rational flow of alternating electric current than the use of large sections.

This conducting hearth block constitutes the original portion of the furnace, of which the working chamber is formed as ordinarily by a metallic structure lined with basic refractories strongly secured and braced. The chamber is enlarged above the hearth for better support of the hearth block. The pisé is easily repaired through the charging doors, after tapping, when necessary.

The body of the furnace is cooled on its entire periphery at the upper level of the hearth, to insure protection at the junction of the lining of the working chamber with the hearth.

The furnace is closed by a roof, through which the electrode passes. The regulation of the electrode is accomplished either by hand or automatically; the latter is more simple and preferable.

To avoid shutdowns when replacing an electrode the latter is placed at the end of a swinging arm, so that it may be removed out of the way and replaced by another electrode all ready at the end of a similar swinging arm; the changing of an electrode is thus accomplished in 2 to 3 min.

The electric furnace, as I have thus described it, allows of the use of one or more vertical electrodes, which are arranged either of the same polarity and in parallel or upon each phase of a polyphase circuit. A three-phase furnace will require, it is understood, three electrodes, and if the star connection is used the neutral point would be connected to the conducting hearth.

I have found that the hearth of a furnace of 3300 lb. capacity, especially dismantled for inspection and study, after several months' service, was in absolutely as good condition as on the first day, the pisé having acquired an extraordinary hardness, comparable to rock, so that a drill was blunted.

I am satisfied that such a construction supplies as simply and surely as possible a noncarburizing conducting hearth, permitting, in an exceedingly simple and certain manner, metallurgical operations, eradicating all the ordinary annoyance of hearths, their repair and recon-

struction, while at the same time providing an electrical conducting hearth free from appreciable industrial losses.

The Electric Furnace with the Conducting Hearth and the Furnace with Electrodes.

The manufacture of steel may be carried out to considerable advantage in a noncarburizing conducting hearth, of course, on the condition that the design of hearth adopted is not a source of annoyance on account of frequent repairs.

Here a question arises as to the advantage which may be obtained with a furnace having a conducting hearth compared with a furnace having vertical electrodes in series, these serving for entrance and exit of the current, a type of furnace which already has an important place in the history of the electrical manufacture of steel. After having made much use of electric furnaces with electrodes in series I am convinced that the question which I propose above, and which I have heard proposed several times, is not without interest, and it was this which led me to carry out a parallel study of the two types of electric steel furnace. I undertook a research as to whether the complete electrification of the mass of molten steel presented a real metallurgical advantage as compared with the process using superficial electric heating characterizing the furnace with electrodes in series.

I believe that an electric furnace with a conducting hearth presents metallurgical advantages over the furnace with electrodes in series so far as concerns a furnace of low or medium capacity. In fact, the method of heating which characterizes the furnace with a conducting hearth, on account of the current being forced to pass through the whole mass, is advantageous as regards the production of a metal having a thoroughly homogeneous quality. Moreover, the furnace with a conducting hearth is of very simple mechanical construction; its starting and operation are more simple when it is used for the treatment of a cold charge; and again it must be noted that the preservation of the roof is easier with a furnace having a conducting hearth.

Yet a formal conclusion is a delicate matter, and I understand the hesitation of the metallurgist who has to compare the two types of furnaces when he desires to produce steels of an altogether high grade, because on *a priori* grounds and with considerable reason he would consider that the electrification of the steel may be advantageous as regards its homogeneity, and thus give the preference to the furnace with the conducting hearth, while at the same time he may be tempted by the greater ease of construction which characterizes a furnace having electrodes in series. It is a fact that this furnace does away with all electrical fittings in its lower part, since the entrance and exit of the current are confined to the upper part, and this is an importance simplification. Moreover, it should be remarked that in the latter type of furnace with an equal rate of generation of energy the current density is only one-half that in the furnace with the conducting hearth, which effects economy in the matter of electric conductors. The furnace with the conducting hearth necessitates a pretty large inductive loop, in which we have the body of the furnace itself, while this is outside the magnetic field in the case of furnaces having electrodes in series. The power factor may be lowered considerably in the first type of furnace if special precautions are not taken. It is necessary to resort to the construction of non-magnetic gaps in the furnace body and its fittings; and in addition great care must be taken to avoid the use of fittings made of a metal of high magnetic permeability, such as wrought iron, cast iron or steel, inside the inductive loop. Although these precautions do not involve an impossibility, they nevertheless present an appreciable difficulty in construction which is far from being so marked in the case of the furnace having electrodes in series, where the in-going and out-going path of the current is altogether outside the furnace body and its fittings.

In my opinion, with a frequency of 20 periods a 1000-kw. furnace may have a power factor of 0.9. Such a furnace used in the refining and finishing of molten

steel will have a capacity of 10 to 12 tons. A furnace of greater capacity could be obtained with the combination of several similar elements, that is by putting several electrodes in parallel, and there is no reason why the power factor should be reduced.

Therefore, as regards the type of furnace having a conducting hearth, the whole practical question is as to the design of the hearth. If the construction of this hearth is such that its electrical conductivity is assured, and that its maintenance is perfectly feasible, the problem is solved, and this type of furnace may be adapted equally well for a unit of large capacity as for one of small capacity.

It remains, then, to determine in a practical way if the method in which the electric current flows in the steel bath forms a real metallurgical advantage. If this is so the furnace with the conducting hearth has a determining factor of preference over the furnace with electrodes in series.

Furnace with Electrodes in Series and Improvements Thereon.

After a series of sundry industrial tests I patented in France* and in certain other countries a furnace with

Following these tests, which, of course, will be found very incomplete, now that the question has been actively elaborated in many places, I installed at the works of the Société des Etablissements Keller-Leleux, at Livet (Isere, France), a two-electrode furnace tapping 5500 lb.

This furnace was experimented with from 1902 to 1905, with the collaboration, from the metallurgical side, of J. Holtzer & Co. of the Unieux Steel Works, Loire, France.

In 1905, following the results obtained at Livet, the installation of an electric furnace of 8 to 10 tons capacity at the Unieux Works was decided upon. This was the first electric furnace adopted in France by a steel works. It was and probably still is the most important electric furnace put into operation.

The Keller Electric Furnace, Installed at the Steel Works of J. Holtzer, Unieux, France.

In the course of the electro-metallurgical campaign started at Livet I was able to satisfy myself that the electric furnace already had a place in the present day steel works, even if electric energy could not be obtained from water hours, but upon condition that the use

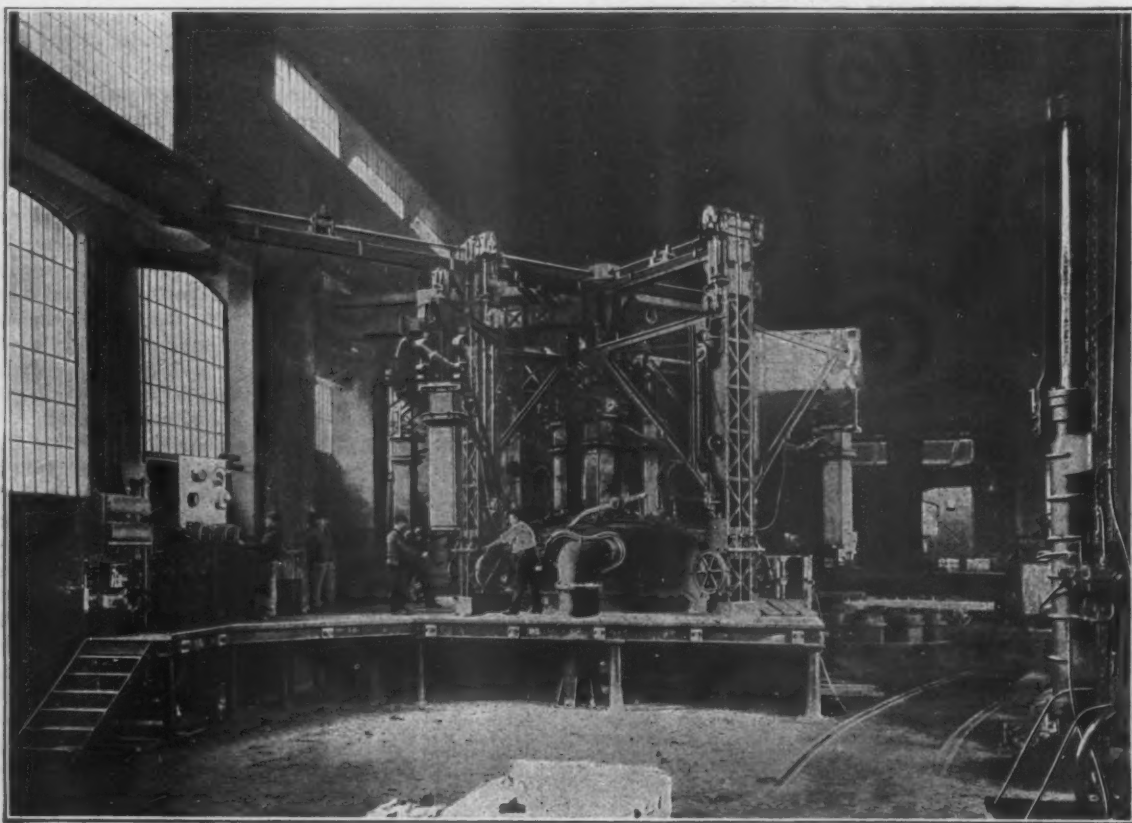


Fig. 3.—The Keller Electric Furnace at Unieux.—Side View.

vertical electrodes for entry and exit of the current, combined with a view to obtaining products by the "tapping" method, the characteristic of this furnace being the separate regulation of the two hearths created respectively at each electrode; that is to say, the realization in a furnace, designed to tap the products obtained, of working two separate chambers above a conductive mass completing the circuit between the two electrodes.

* Until 1902 I experimented with this furnace at the Kerrouse Works (Morbihan, France) for various applications, and notably for the manufacture of steel, when starting up with cold charges. I had available at Kerrouse a furnace tapping 1750 lb., permitting me to make steel ingots, which were tested at various places.

The much mourned Ch. Bertolus of St. Etienne visited this installation and made it the object of a communication to the Congrès de la Houille Blanche in 1902. Mr. Bertolus had previously made tests of the steel ingots from Kerrouse at several steel works in the neighborhood of St. Etienne, and published the results of the tests made at one of these works.

* French patent Ch. A. Keller, No. 300,630, December 15, 1899.

of the electric furnace should be confined to reheating, mixing, deoxidation and purification of steel.

So as early as 1902 I patented* a method of dividing the manufacture of steel into two phases, confining to special electric furnace the operations above indicated. Liquid steel as obtained by the ordinary methods not being available, as the Livet Works did not have metallurgical furnaces for making steel, I installed two electric furnaces, one suspended above the other, the upper furnace serving for the oxidizing fusion of iron and steel scrap, the second taking the liquid steel so melted.

I was thus able to determine the quantities of energy useful for each operation, and the scheme adopted for the Unieux installation arose from this series of experiments. Holtzer & Co. were the first metallurgists who decided to commence the construction of a complete electro-metallurgical installation, intended for finishing in an electric furnace steel previously melted and refined. The necessary energy for this installation is furnished by a steam engine.

The electric furnace of the J. Holtzer Steel Works is

* French patent Ch. A. Keller, No. 329,013, February 2, 1903.

of the type with four vertical movable electrodes for carrying the current. Each electrode forms at its base a heating zone in which the temperature can be regulated. Each pole carries two electrodes in parallel. The construction of this furnace, Figs. 1, 2 and 3, includes four principal groups or parts:

a. The movable furnace body, simply a metallurgical vessel without any electrical connection whatever, with its support and suitable hydraulic movement.

b. The rotatable electrode supports, with means for suspending the electrodes and making electrical connection with the central block or tablet for distribution of electric current. These supports are completely independent of the furnace body, and when they are all turned outward the cover of the furnace may be easily lifted or removed.

c. The overhead system of bus bars for distribution of current, with fixed laterals for the movable connections to the revolving electrode brackets.

d. The control board for the electrodes, with suitable valves for distant control, and the measuring instruments.

The movement of the electrodes is accomplished by means of hydraulic motors, and the following combinations can be made: Simultaneous raising of two electrodes of the same polarity or of the four electrodes together. Simultaneous raising of two electrodes of the same polarity and simultaneous lowering of two electrodes on the other pole. Raising of one electrode and simultaneously lowering of the other electrode of same polarity.

Separate movement of any electrode.

The regulation of the electric circuits is obtained very simply in the following manner:

1. *Regulation of Voltage.*—For voltage regulation the two electrodes of same polarity are moved simultaneously; if there is simply an inequality of voltage between the two poles, the two electrodes on each pole are simultaneously moved up and down with respect to each other. Thus, by a single maneuver, the balancing of voltage is accomplished. These combinations for maneuvering the electrodes are very simply realized by a suitable arrangement of gears commanding the valves of the hydraulic motors.

2. *Regulation of Amperage.*—The amperage is equally divided between the four electrodes by means of their separate movement; if there is simply an inequality of amperage between two electrodes of the same polarity, there is a simultaneous and inverse movement of these two electrodes. Thus also by a single maneuver the amperage is balanced between the electrodes.

This method of regulation, by balancing of the voltage or amperage of one group of electrodes with the other, or of one electrode with the other of the same group, enables the use of a very simple and rational controller.

I have applied, for the distribution of current to the furnace, an arrangement which I have called "radiating electrical distribution" (distribution électrique rayonnante*), which enables me to reduce the self-induction to the lowest possible limit.

As I said before, the two electrodes of same polarity are in parallel. The total current is brought to the center of the furnace, above all its mechanical parts, by a system of interlaced copper bars, connected to a central block firmly held by the metallic supports of the framework of the furnace. From this block four electric circuits radiate, each carrying two connectors for each electrode; one of these connectors is always idle. By this arrangement are obtained eight terminals, by means of suitably fitted copper bars, each group consisting of 10 needed for replacing an electrode. Metallurgical operations are suspended at the end of the jointed arms which carry the fittings for connecting the electrode circuit to the connectors coming from the central block.

The mode of distribution employed has the important advantage that it permits the replacing of an electrode while the furnace is running. The method of construction described also reduced to several minutes the time needed for replacing an electrode. Metallurgical opera-

tions may, therefore, be carried on without any interruptions due to handling of the electrodes.

When the rotating arms carrying the electrodes are turned outwardly, Fig. 1, the furnace body is entirely free of overhead encumbrances. The central connection block, which is placed high and out of the way, does not interfere with the lifting of the roof, the latter being rapidly done by means of the traveling crane which passed over the furnace. In this way any roof requiring repairs may be easily replaced by a spare one; furthermore, the roof being lifted, repairs to the hearth itself are very easily made.

The overhead central distributing system, having radiating branches placed directly above the electrodes, gives such low self-induction that tests made at the J. Holtzer Steel Works have shown that the value of $\cos \phi$ was about 0.97 with a current of 12,000 amperes. Consequently this arrangement easily permits of the use of heavy currents under very favorable conditions and without fear of any serious lowering of the power factor.

The incumbrances above the furnace are much diminished by the use of a special fitting for the electrical connection between the electrodes and the overhead fixed terminals. Obviously the means of carrying the current between these parts should have a certain flexibility to permit of lowering and raising the electrodes. To avoid every chance possible of short circuits between the two poles in the movement of electrodes, and in view of the close proximity of the electrodes, I have adopted the following arrangement: *

Very thin flexible bars, of $\frac{1}{2}$ mm. thickness, for example, are attached at one end with the fixed conductors connected to the central bus bar system and with the electrode support. These flexible bars are divided into two sets, expanded and brought together again at several points in their length, where they are securely fastened. There is thus formed a series of flexible rings which contract and enlarge according to the position of the electrode. Where the bars are fastened together to complete each circle they are fitted with small rings which slide up and down on cylindrical rods, thus acting as a guide.

This method of fitting produces a supple connection between the bus bar terminals and the electrodes without introducing any overhanging protuberances larger than the natural transverse section of the electrode, thus leaving the space between the electrodes entirely free.

The four electrodes entering into the working chamber of the furnace pass through an arched roof covering the furnace.† The vessel containing the steel is circular in form and is lined with magnesite. The furnace body is supported on heavy steel runners, working on rollers, by which it may be tilted as desired.

The tilting of the furnace may be in either the forward or backward direction for tapping the steel or the slag; this is done by means of hydraulic cylinders.

The furnace body is fitted with openings in its circumference for charging or watching the metallurgical operations.

During working the gases generated in the interior of the chamber create a slight pressure; this condition is imperative to avoid all entrance of air, which would be prejudicial to the deoxidizing conditions wanted. The gases and vapors from the interior of the

* French patent Ch. A. Keller, No. 387,462, May 6, 1907.

† I have experimented with and put into practice on a large scale at the Livet Works an improvement in electric furnaces with electrodes in series; this improvement consisted in placing each electrode or each series of electrodes of different polarity in a separate chamber (French patent Ch. A. Keller, No. 336,403, November 2, 1903). The two chambers thus formed were joined at the bottom by a canal filled with the metal being treated and which might exist there, according to circumstances, in either the solid, pasty or liquid state. When the metal in the canal exists in the solidified state we have a furnace having a lateral metallic pole very close in type to the furnace with conducting bottom previously described.

The placing of electrodes of differing polarity in separate chambers has the advantage of producing a furnace in which the electric current passes through the entire depth of the fused metal. Further, there is a benefit in construction resulting from having both poles formed by superposed electrodes.

If in a furnace of the above described type the electrode in one of the chambers is lowered until it touches the metal contained therein, this hearth is, therefore, in short circuit, and by this fact the energy absorbed becomes nil. This variation in the method of operation of furnaces having separate chambers connected by a canal underneath has been used by Mr. Chaplet and the Société la Neo-Metallurgie (French patent Chaplet and Neo-Metallurgie, No. 270,005, September 25, 1906), for the construction of steel furnaces, applied at the Alevard Steel Works in Isere.

* French patent Ch. A. Keller, April 28, 1908.

furnace pass out through a pipe connected therewith and into a chimney having an adjustable draft.

Results of Working of the Electric Furnace at the J. Holtzer Steel Plant.

In Unieux steel is melted in an open hearth furnace, then poured into a ladle which is immediately emptied into the electric furnace. The molten steel is thus put in circuit and the operations of deoxidation, additional refining and adjustment of chemical composition carried out. The refining may be carried to: Sulphur and phosphorus, 0.01 per cent.

The regular practice gives sulphur and phosphorus about 0.015 to 0.02 per cent. The period of treatment varies, of course, with the quality of steel desired. As an example of regular practice, there may be quoted the following results abstracted officially and checked:

Weight of charge put into electric furnace.....7,500 kg.
Mean energy generation during operation.....750 kw.
Period of working.....2 h. 45 min.
Composition of molten charge: Carbon, 0.15 per cent.; sulphur, 0.06 per cent.; phosphorus, 0.007 per cent.
Carbon content sought.....0.45 to 0.50 per cent.
Analysis of product: Carbon, 0.443 per cent.; sulphur, 0.009 per cent.; phosphorus, 0.008 per cent.
Energy consumed per ton.....275 kw.-hr.
Electrode consumption, 18 mm. per hour for 4 electrodes having a cross section of 400 x 400 mm.

For continuous working, and assuming the cost of electrodes to be 35 francs per 100 kg., this corresponds to a cost of about 4 francs (80 cents) per ton of steel. The labor on the furnace, including feeding of the necessary materials, was provided by three laborers and one melter. The regulation was manual and attended to by one of the three laborers, who looked after the repair of the furnace and the connection of the electrodes. The regulation could be carried on just as well by automatic regulators, but the regular behavior of the furnace, due to the existence of two parallel hearths for each pole, made automatic regulation by no means indispensable.

As another result of the metallurgical work of the Unieux furnace, I will quote, for example, a heat made for the production of 1000 kg. of ingots ordered from the Unieux Works by a foreign steel works. It required the manufacture of a steel or armor plate quality. The analysis of the steel supplied was as follows: Carbon, 0.30 per cent.; silicon, 0.20 per cent.; manganese, 0.56 per cent.; sulphur, 0.007 per cent.; phosphorus, 0.013 per cent.

The steel contained besides a certain quantity of nickel. The acceptance tests on these ingots were made on plates of 36 mm. thickness rolled to a width of 325 mm.

The test pieces, 13.8 mm. in diameter and 100 mm. between marks, gave the following results:

	Elastic limit. Pounds per square inch.	Ultimate strength. Pounds per square inch.	Elongation. Per cent.	D/d.
1. Longitudinal	86,300	112,000	17.0	5.3
2. Longitudinal	86,300	113,000	16.5	4.8
1. Transverse	86,300	112,000	14.0	3.3
2. Transverse	88,000	112,500	14.0	3.4

NOTE.—Apparently the longitudinal test means that the test piece was cut out with its longest dimension in the direction of rolling, while the transverse test piece was cut with its longest dimension perpendicular to the direction of rolling.

Drop test on unnotched specimens:

Longitudinal specimen.
Deflection at 15th blow.....24 mm.
Angle of rupture.....30
Fracture.....Long fibers.

Transverse specimen:

Deflection at 15th blow.....24 mm.
Angle of rupture.....86
Fracture.....Short fibers.

Drop test on notched specimens:

Longitudinal specimen.
Ruptured at 7th blow.
Angle of rupture.....147
Fracture.....Wholly fibrous.

Transverse specimen:

Ruptured at 4th blow.
Angle of rupture.....158
Fracture.....Fibrous.

The drop tests were made on bars 30 x 30 mm., with the following conditions:

Unnotched bars:

Distance of supports.....160 mm.
Weight.....18 kg.
Height of drop.....2.75 m.

Notched bars:

Distance of supports.....100 mm.
Weight.....18 kg.
Height of drop.....1.50 m.

The treatment of the metal consisted in two temperings in water at a clear cherry red on the unwrought, rolled and annealed plates.

The qualities of these steels, both from the point of view of purity and that of various mechanical tests, are a proof that the electrode furnace forms a metallurgical apparatus in every sense of the term; a flexible apparatus which permits of precise metallurgical work; a new metallurgy, not because of the absolute material results obtained (for up to the present the quality and purity of the best crucible steels have never been surpassed), but because of the method used, which differs in no respect from that governing the operation of the open hearth furnace, perfected by new results procured by the high temperature and the neutral atmosphere which result from the employment of an electric source of heat.

I do not desire here to draw a parallel between the furnace without electrodes and the electrode furnace. But I cannot do otherwise than express the opinion that if we consider the simple and extensive metallurgical facilities provided with electrodes, and the small electrode consumption per ton of steel, we are led to ask how it can be argued that elimination of electrode (and a loss of some of the advantages which they possess) can constitute a determining factor in the adoption of a furnace without electrodes in preference to an electrode furnace.

Again it must be added that the construction of electrode furnaces is very simple, and that the electrical equipment which supplies them belongs to ordinary everyday electric construction, and that the furnaces without electrodes are of complex construction, and that they cannot, as it seems to me, be left without hesitation to the ordinary workman.

The Three-Phase Current.

The electrode furnace should find its principal place in metallurgy in the direct application of three-phase currents, for many steel works already have central stations supplying three-phase current. Finally, at the present day the transmission of energy is generally installed in the form of three-phase current, and, therefore, it is necessary to consider the use of this form of current in order to fill the demands of most cases which are presented.

These considerations have led me to a study of a three-phase furnace for the manufacture of steel. This furnace may be worked with electrodes connected in delta or star. In the first case, each of the three electrodes is connected respectively with each phase of the circuit; in the second case, the electrically reinforced part of the furnace which I have described is connected to the neutral point of the three-phase system.

The three-phase electric furnace combines to a great extent the qualities of furnaces with electrodes in series and furnaces with conducting hearths if the connection is in star, for the molten steel is completely electrified and at the same time the electric current passing through the hearth is less than one-half the total current in use. It is possible to-day to approach without fear the construction of a three-phase furnace having a capacity of 20 tons, which would necessitate the use of about 1800 kw. Such a furnace would be capable of purifying 250 to 300 tons per day of ordinary steel from the basic Bessemer converter in a series of heats which would last about 1½ hr. each, and which would bring the sulphur content of the molten steel from the basic converter from 0.08 to 0.02 per cent. approximately, at the same time permitting of deoxidization and decarburization as required. The cost of work of this kind would vary from 15 to 20 francs per ton of steel treated, calculating electric energy at 0.015 francs per kilowatt hour, a price which may be reached with gas engines supplied from blast furnaces if no value is assigned to the gas and estimating the other factors of cost at a price corresponding to their usual value.

The passage of steel through the electric furnace where, under the influence of superheating, it would be

subjected immediately, and by a rapid process, to a marked desulphurization, would permit the use in the converter of a pig iron richer in sulphur. This advantage would enable a metallurgical plant taking advantage of this circumstance to use ores which otherwise would have been rejected, and thus the introduction of the electric furnace in such a plant would have a two-fold and important economic application.

The possibility of economically interpolating the electric furnace in the general cycle of great metallurgical operations should open a new era: that in which the employment of the so-called ordinary qualities of steel is gradually abandoned. In giving to structural steel and rail steel additional qualities of safety, the electric furnace will contribute to the realization of a higher civilization by diminishing in great part the probabilities of catastrophes due to defects in quality. There can be no doubt that, impelled by their traditional initiative and by the sense of the imperious necessity of always doing better, the metallurgical works of the highest class will shortly take up the method of electrometallurgy. Nor is it to be doubted that great public or private authorities, conscious of the responsibility and obligation which humanity imposes upon them above all, will soon base their requirements as to steel on the new guarantees which the most recent progress of modern technology reveals to them through electrosiderurgy.

The Maxwell-Briscoe Bids on Material and Supplies.

Considerable interest was shown by purchasing agents and machinery and supply dealers in an advertisement which appeared in *The Iron Age* of March 18 last and in two other trade journals calling for bids on thousands of dollars' worth of material and supplies for the Maxwell-Briscoe Motor Company, Tarrytown, N. Y. On April 1 *The Iron Age* detailed the result of this innovation in buying methods, which showed, according to E. R. Gormully, purchasing agent for the company, that considerable office detail and correspondence had been saved through the advertisements. All of the bids for the equipment listed are now in and they include propositions from 248 different manufacturers, directly traceable to the advertising.

Mr. Gormully is convinced that some very advantageous contracts he has placed have been due to the publicity he gave to the company's wants. The replies he received to the advertisements disclosed a wide difference in the prices demanded, especially in some lines. For instance, the bids on chrome nickel steel, made according to specifications prepared by Mr. Gormully, ranged from $6\frac{1}{2}$ to $13\frac{1}{2}$ cents per pound. The bids on cone steel, of which the company required 50 tons, ranged from 4.90 to 11 cents per pound, and the order was placed at $6\frac{1}{2}$ cents per pound, the samples offered at below that price not being up to the specifications. Bidders for furnishing 50 tons of $3\frac{1}{2}$ per cent. nickel steel asked from $4\frac{1}{2}$ to 10 cents per pound. One of the most promising results from the bidding was the wide variety of prices asked for furnishing gear steel according to Mr. Gormully's specifications. Seven companies, all prominent manufacturers, put in bids on this material and they asked from 2.40 cents per pound all the way to 15 cents. The contract, which called for 200 tons, was placed at 2.75 cents per pound.

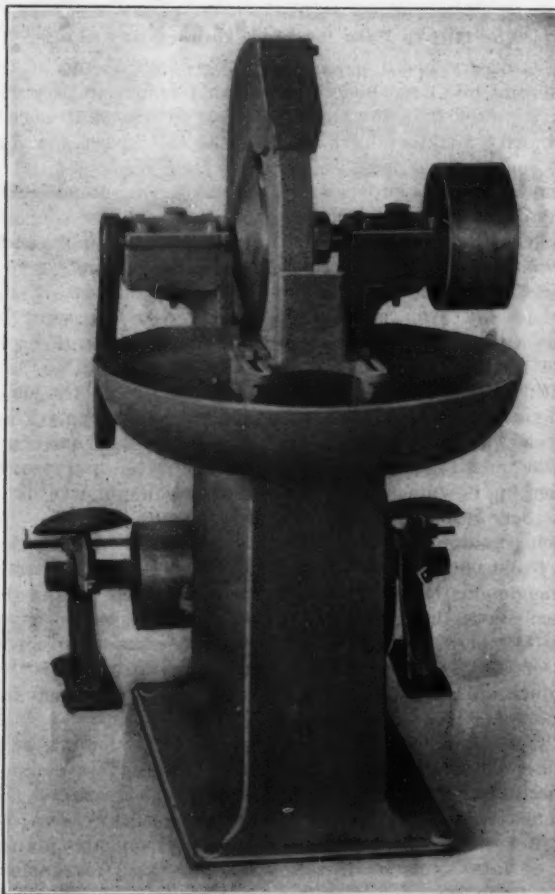
On such material as 1000 tons of soft steel bar, 800 tons of malleable iron, and standard supplies, such as machine bolts, cap screws, carriage bolts, twist drills, &c., the bids were fairly uniform, and in such manufactured supplies as oil cans and guns, files, &c., the difference in quality of the samples offered figured largely in the awarding of the contracts.

The Harbison-Walker Refractories Company, Pittsburgh, has been awarded a contract for the firebrick required for three McClure hot blast stoves for the new blast furnace of the Worth Brothers Company, Coatesville, Pa., also for 3,250,000 brick for 300 longitudinal coke ovens being erected by the Pittsburgh & Westmoreland Coal Company, Pittsburgh.

The Sterling 24-In. Tool Grinder.

A new tool grinder of simple construction manufactured by the Sterling Emery Wheel Mfg. Company, Tiffin, Ohio, is equipped with a special device to furnish a good supply of water when in operation. As soon as the machine stops the water drains out of the wheel, leaving it dry and in balance. The machine may be used as a dry grinder by removing the small belt on the left hand side. Each grinder is equipped with a 2 x 24 in. grinding wheel of special material. The machine can be arranged to carry a wheel 3 in. thick if necessary at slight additional cost.

The floor space of the machine is 30 x 45 in., and the height to the center of the arbor is 37 in. The self-oiling



The New 24-In. Single Wheel Tool Grinder, Built by the Sterling Emery Wheel Mfg. Company, Tiffin, Ohio.

bearings are $1\frac{1}{8}$ x 7 in. The driving pulley is 10 in. diameter by $4\frac{1}{2}$ in. face, and the flanges for the wheel are 12 in. diameter. The weight of the machine complete with the countershaft is 900 lb. The drop of the countershaft hangers is 10 in.; the length of the shaft 32 in., and its diameter 1 5-16 in.; the tight and loose pulleys are 8 in. diameter by $4\frac{1}{2}$ in. face; the driving pulley is 14 in. diameter by $4\frac{1}{2}$ in. face, and the speed of the countershaft about 500 rev. per min.

The Passaic Steel Works Sold.—Conflicting interests eager for the control of the Passaic Steel Works, Paterson, N. J., engaged in a controversy that almost approached a fistic encounter when the plant was sold for \$190,000, on May 28, by the receivers appointed by the United States District Court Judge Lanning. Henry P. Brown of Philadelphia, acting as counsel for bondholders, declared that his clients were deprived of an opportunity to make a larger bid, and that the sale would be contested. The property was sold to Lawrence Fagan of Jersey City, owner of the Fagan Iron Works.

The district offices of the General Electric Company, at Salt Lake City, Utah, have been removed to the New-house Building.

Tariff Revision in the Senate.

The Passage of the Bill Delayed.

WASHINGTON, D. C., June 1, 1909.—Obstructive tactics on the part of the opponents of the tariff bill as reported to the Senate by the Finance Committee have so delayed the consideration of the measure that all predictions as to the date of its enactment heretofore made have been discredited, and at this writing no one expects that the bill will be sent to the White House for the President's signature before July 1. Every possible effort is being made, however, to secure an agreement upon a date for the final vote in the Senate, and it is the hope of the Republican leaders that the measure will be passed and sent to conference not later than June 15.

The Bill to Pass Without Important Change.

Contrary to all precedent, the real opponents of the pending bill have been the so-called insurgent Republicans rather than the Democrats. It is true that certain minority Senators have opposed the bill in set speeches of considerable length and have thus consumed much time, but the "progressive," or insurgent, Republicans have constituted the active opposition, and for the first time in the history of tariff legislation have fought their own former leaders, with an energy never displayed by the Democratic minority, to reduce the rates of the Senate bill even below those fixed by the House. That the bill will eventually pass the Senate substantially in the form as reported by the Finance Committee, and with only such supplemental amendments as the committee may approve, is now a foregone conclusion. Time after time the insurgent Republicans and the Democrats have united against the committee for the purpose of breaking down a rate on the contention that it was higher than either the House bill or the Dingley law. On each occasion, however, Chairman Aldrich has succeeded in polling a majority of from 7 to 25 votes for the Senate amendment. In nearly every instance he has broken the Democratic lines and secured recruits from the heart of the Democratic camp, notably when he was able to poll 18 of the 31 Democratic votes in the Senate in favor of a duty on iron ore, which the House had placed on the free list.

It is significant that many Democratic Senators have boldly championed protective duties, some, like Senator Daniel of Virginia, declaring frankly in favor of the protective principle, while others, like Senators Clay and Bacon of Georgia, have supported relatively high duties on certain items on the ground that "the Government needs the revenue." It has been made perfectly clear that the sharp alignment of parties on the tariff question, which has characterized the deliberations of Congress upon former revenue measures, is a thing of the past and that sectional as well as political lines on this important subject have been completely broken down.

The Real Contest in Conference.

In view of the certainty that the bill as amended by the Finance Committee will be passed by the Senate without material change, taken in connection with the fact that the provisions of the House and Senate bills vary in important particulars, it is obvious that the real contest will be fought out in conference. The make-up of the Conference Committee and the period to be spent by the committee in the discussion of the bill, therefore, are matters of much importance and are the subjects of no little speculation here. Early in the consideration of the bill in the House it was proposed in the interest of expedition that the Conference Committee should be composed of three members of each house. Had this idea been adopted the House conferees would have been Representatives Payne and Dalzell, Republicans, and Clark of Missouri, Democrat, while those on the part of the Senate would have been Senators Aldrich and Burrows, Republicans, and Daniel, Democrat. It was argued that a comparatively small Conference Committee of six members would make much more rapid progress in the consideration of the bill than would be possible if each house should designate a representation of six or eight

members, as was done in the case of the Dingley act. As the consideration of the bill has proceeded, however, it has become apparent that some of the most important controversies involved in the pending legislation must be fought out in conference, and the various interests have, therefore, demanded that their special champions in the Ways and Means and Finance committees shall be selected as members of the Conference Committee. It now seems probable, therefore, that eight or nine members of each house will be appointed as conferees and that the entire committee will number 16 or 18 members.

How long the bill will remain in conference after its passage by the Senate can only be conjectured, but it is interesting in this connection to recall the fact that 19 days were required for the consideration of the Dingley bill by the conferees. As to the pending bill, the two houses are at odds with reference to some of the most important schedules. While the Finance Committee has yet to report the amended rates on a number of items, it is tolerably certain that when the bill goes to conference the Senate conferees will stand as the champions of duties on iron ore, coal, petroleum, hides, wood pulp and other important products which the House placed on the free list, and for materially increased rates on iron and steel, lumber, paper, leather and other commodities which the House reduced below the level of the Dingley act.

With these considerations in mind there would seem to be little reason to believe that the Conference Committee can harmonize the differences between the two houses in less time than was required in the case of the Dingley bill, but it is characteristic of Congressional proceedings that after many weeks of hair-splitting discussion on details of more or less importance, it is frequently practicable to bring about a final settlement involving many important issues in an astonishingly short period of time. The fact should also be borne in mind that more or less exchange of opinion is currently taking place between the members of the Ways and Means and Finance committees regarding disputed items, and some progress is thus being made toward a final agreement. It is also a fact that some of the higher rates incorporated in the Senate bill by the Finance Committee have been deliberately adopted with a view to trading with the House in conference.

Income Tax an Element of Uncertainty.

An element of much uncertainty in the present situation is the income tax proposition recently brought forward on behalf of the Democratic minority by Senator Bailey of Texas, and championed in a modified form by Senator Cummins of Iowa, one of the insurgent Republican leaders. Senator Bailey has made several ineffectual attempts to force a vote upon his amendment, but on each occasion has encountered the opposition of Senator Aldrich, who has finally succeeded in having its consideration definitely postponed until June 10. Senator Bailey's amendment provides for the collection of a tax of 3 per cent. annually on all incomes in excess of \$5000, and extends the levy to the "net gains, profits and income from and above \$5000, of all banks, banking institutions, trust companies, saving institutions, fire, marine, life and other insurance companies, railroad, canal, turnpike, canal navigation, slack water, telephone, telegraph, express, electric light, gas, water, street railroad companies and all other corporations, companies or associations doing business for profit in the United States, no matter how created and organized, but not including partnerships." The "net gains, profits and income" include the amounts paid to shareholders or carried to the account of any fund, or used for construction, enlargement of plant or other expenditure or investment paid from the net annual profits made or acquired by any corporation, company or association liable to the tax. A feature of the Bailey amendment of special interest to the officials of corporations prescribes the character of the return to be made annually to the Commissioner of Internal Revenue as follows:

Every corporation, company or association doing business for profit in the United States shall make and render to the collector of the collection district in which it has its principal office, or if it has no principal office then in which it is transacting business, on or before the second Monday in March in

every year, a full return, verified by oath or affirmation, in such form as the Commissioner of Internal Revenue next preceding the date of such return:

First. The gross profits of such corporation, company or association, from all kinds of business of every name and nature.

Second. The expenses of such corporation, company or association, exclusive of interest, annuities and dividends.

Third. The amount paid on account of interest, annuities and dividends, stated separately.

Fourth. The amount paid in salaries, with a list of all officers, employees and persons receiving more than \$5000 per annum, stating the name and address of such officers, employees and persons.

Fifth. The net profits of such corporation, company or association, without allowance for interest, annuities or dividends.

And any corporation, company or association failing to comply with the requirements of this section shall forfeit as a penalty the sum of \$1000 and 2 per cent. of the amount of taxes due, for each month until the same is paid, the payment of said penalty to be enforced as provided in other cases of neglect and refusal to make return of taxes under the internal revenue laws.

The taxes herein provided for shall be assessed by the Com-

missioner of Internal Revenue and collected and paid upon the gains, profits and income for the year ending the 31st of December next preceding the time for levying, collecting and paying said tax; shall be due and payable on or before the 1st day of July in each year; and to any sum or sums annually due and unpaid after the 1st day of July as aforesaid, and for 10 days after notice and demand thereof by the collector, there shall be added the sum of 5 per cent. on the amount of taxes unpaid, and interest at the rate of 1 per cent. per month upon said tax from the time the same becomes due, as a penalty, except from the estates of deceased, insane or insolvent persons.

THE IRON AGE

Increased Rates in the Metal Schedule.

Senator Culberson of Texas, the Democratic minority leader of the Senate, has prepared some interesting statistics intended as an answer to the statement recently presented to the Senate by Senator Aldrich showing the reductions made in the Senate bill below the level of the Dingley law. Senator Culberson makes the point that Senator Aldrich's statement was incomplete in that it failed to show also the increases. He has, therefore, prepared a table showing the percentage by which the Senate bill increases duties above the Dingley rates. This statement embraces the following items in the metal schedule:

Increases in Duties as Compared with Dingley Rates.

Articles.	Rates of duty.		Per cent. of increase.
	Present law.	Senate bill.	
Steel ingots, cogged ingots, blooms and slabs, &c., valued above 16 cents per pound	4 7-10c per lb.	7c. per lb.	48.94
Sheets and plates, n.s.p.f., valued above 16 cents per pound.	4 7-10c. per lb.	20%.	82.65
Steel ingots, blooms and slabs, n.s.p.f.:			
Cold rolled, cold drawn, cold hammered, or polished in any way, valued above 16 cents per pound.	4 7-10c. and 1/4c. per lb.	6c. ad 1/4c. per lb.	23.73
Cold rolled, cold hammered, blued, &c., better than the grade of cold rolled, smoothed only, valued above 16 cents per pound.	4 7-10c. and 1c. per lb.	6c. and 4-10c. per lb.	12.28
Sheets and plates, n.s.p.f., better than grade of cold rolled, valued above 16 cents per pound.	4 7-10c. and 1c. per lb.	7c. and 4-10c. per lb.	29.82
Steel circular saw plates valued above 16 cents per pound.	5 2-10c. per lb.	20% and 1/4c. per lb.	61.92
Card clothing:			
Manufactured from tempered steel wire.	45c. per sq. ft.	55c. per sq. ft.	22.22
Other	20c. per sq. ft.	45c. per sq. ft.	125.00
Castings, cast iron vessels, plates, stove plates, andirons, tailors' irons, &c., castings of iron, n.s.p.f.	8-10c. per lb.	35%.	221.69
Cutlery, razors and razor blades, finished or unfinished:			
Valued less than \$1.50 per dozen.	50c. per doz. and 15%.	6c. each and 40%.	76.59
Valued \$1.50 and less than \$3 per dozen.	\$1 per doz. and 15%.	10c. each and 40%.	60.11
Valued \$3 per dozen or more.	\$1.75 per doz. and 20%.	12c. each and 50%.	41.61
Files, file blanks, rasps and floats of all cuts and kinds, 7 in. in length and over.	\$1 per doz.	40%.	18.31
Sheets, plates, wares or articles of iron, or other metal, enameled or glazed with vitreous glasses.	40%.	45%.	12.50
Needles for knitting or sewing machines, including latch needles.	\$1 per M. and 25%.	\$1.25 per M. and 25%.	10.09
Antimony as regulus or metal.	1/4c. per lb.	1 1/4c. per lb.	100.00
Copper, sheathing, or yellow metal, &c.	2c. per lb.	2c. per lb.	5.50
Tinsel wire, lame or lann, of gold, silver, or other metal.	5c. per lb.	10c. per lb.	100.00
Bullion and metal threads, made of tinsel wire, &c.	5c. per lb. and 35%.	10c. per lb. and 30%.	1.48
Laces, embroideries, braids, &c., made of metallic threads.	60%.	1c. per lb. and 60%.	19.60
Ferrotungsten	\$4 per ton.	20%.	4,900.00
Ferrochrome	\$4 per ton.	20%.	1,049.42
Penholder tips and penholders, or parts of.	25%.	25c. per gr. and 25%.	100.00
Watch movements:			
Having not more than 7 jewels.	35c. each and 25%.	65c. each.	15.40
Having more than 7 and not more than 11 jewels.	50c. each and 25%.	\$1.35 each.	9.51
Having more than 11 and not more than 15 jewels.	75c. each and 25%.	\$1.85 each.	17.69
Zinc in ore.	20%.	\$11.20 per ton.	281.75
Calamine (zinc ore).	Free.	\$11.20 per ton.	Infinite.
	Free.	\$11.20 per ton.	Infinite.

missioner of Internal Revenue and collected and paid upon the gains, profits and income for the year ending the 31st of December next preceding the time for levying, collecting and paying said tax; shall be due and payable on or before the 1st day of July in each year; and to any sum or sums annually due and unpaid after the 1st day of July as aforesaid, and for 10 days after notice and demand thereof by the collector, there shall be added the sum of 5 per cent. on the amount of taxes unpaid, and interest at the rate of 1 per cent. per month upon said tax from the time the same becomes due, as a penalty, except from the estates of deceased, insane or insolvent persons.

The Amendment Not to Pass.

While the insurgent Republicans are not prepared to vote for the Bailey income tax amendment without modification, it is probable that an agreement will be reached among the advocates of this form of taxation that will develop the full strength of the movement in the Senate. The motion to postpone the consideration of the Bailey amendment to June 10 was carried by a vote of 50 to 33, but these figures should not be taken as indicating the strength or weakness of the income tax proposition. Several of the Senators known to favor the Bailey amendment are anxious that it shall not be taken up until all the schedules have been disposed of and, therefore, voted for postponement.

The plan of the Senate leaders to dispose of the income tax project has been laid with characteristic skill and diplomacy. Chairman Aldrich is believed to have secured pledges from a majority of the Senate to favor a resolution which he will present referring the subject to the Judiciary Committee, with instructions to make a thorough investigation as to the constitutionality of the taxing of incomes by the Federal Government, and to frame a bill for that purpose "whenever after a rea-

sonable period it shall be demonstrated that the revenue producing capacity of the new tariff law is inadequate." It goes without saying that votes can be secured for such a resolution that could not be polled either for or against an income tax amendment, and its adoption by a comfortable majority is more than probable.

The Russian Steel Syndicate.—It is reported that the participation of the different members of the Russian steel syndicate, "Prodamentá," in the sale of shapes by percentages is as follows: Donetsk-Jurjewa, 12.18; Soc. An. Metallurgique Dnieprovienné du Midi de la Russie, 8.26; Russo-Belge, 8.26; Tsarizina-Oural-Volga, 7.79; Guta-Bankowa, 6.87; Alexandrowa works of the Brjank Company, 6.79; Novo-Rossiska, 6.59; Ssulinsk N. P. Pastuchow, 6.59; Konstantinowa, 6.18; Tanganrog, 4.52; Ostrowetzka, 4.29; Marionpol works of the Russki Providence, 4; Sawerze, formerly Gebrueder Guldshinski, 3.60; Starachowizk, 3; Drushkow, 2.25; Czenstochow works B. Handtke, 2; Milwitzk and Ekaterin works at Sosnowice, each, 1.99; Hartmann at Lugansk, 1.53; and Puschkin at Sosnowice, 1.26. The total capacity of the mills for shapes is 35,000,000 lb. (562,500 gross tons) annually.

W. I. C.

The Improved Western Radial Drill.

Strength and rigidity of the design as a whole and an exceedingly convenient disposition of the operating handles and other controlling devices are one's first impressions of the improved radial drill manufactured by the Western Machine Tool Works, Holland, Mich. Other features are the complete self-oiling system, the low-hung drive and the triple-gear arrangement of the head, which gives a greatly increased transmission of power. Among the novel details are the driving belt shifter, the speed changing mechanism, and the friction clutch controlling the feeds.

Fig. 1 is a general view of the machine and Fig. 2 an elevation partly in section which shows the construc-

tion of the gear box at the top of the column, and in Fig. 1 may be seen the speed barrel which is located directly below on the column. This speed barrel has eight different positions corresponding to as many speeds and the back gears on the head double this range making 16 spindle speeds possible. This gives a range of speeds from that suitable for a $\frac{1}{8}$ -in. drill to that for a 6-in. pipe tap. The rod to which the gear barrel is fastened enters the gear box, where it has rack teeth cut around its circumference to engage with a gear sector, which in turn controls the position of a rocker arm, carrying two intermediate gears, either one of which may be thus caused to mesh with any one of a cone of four gears. This rod also

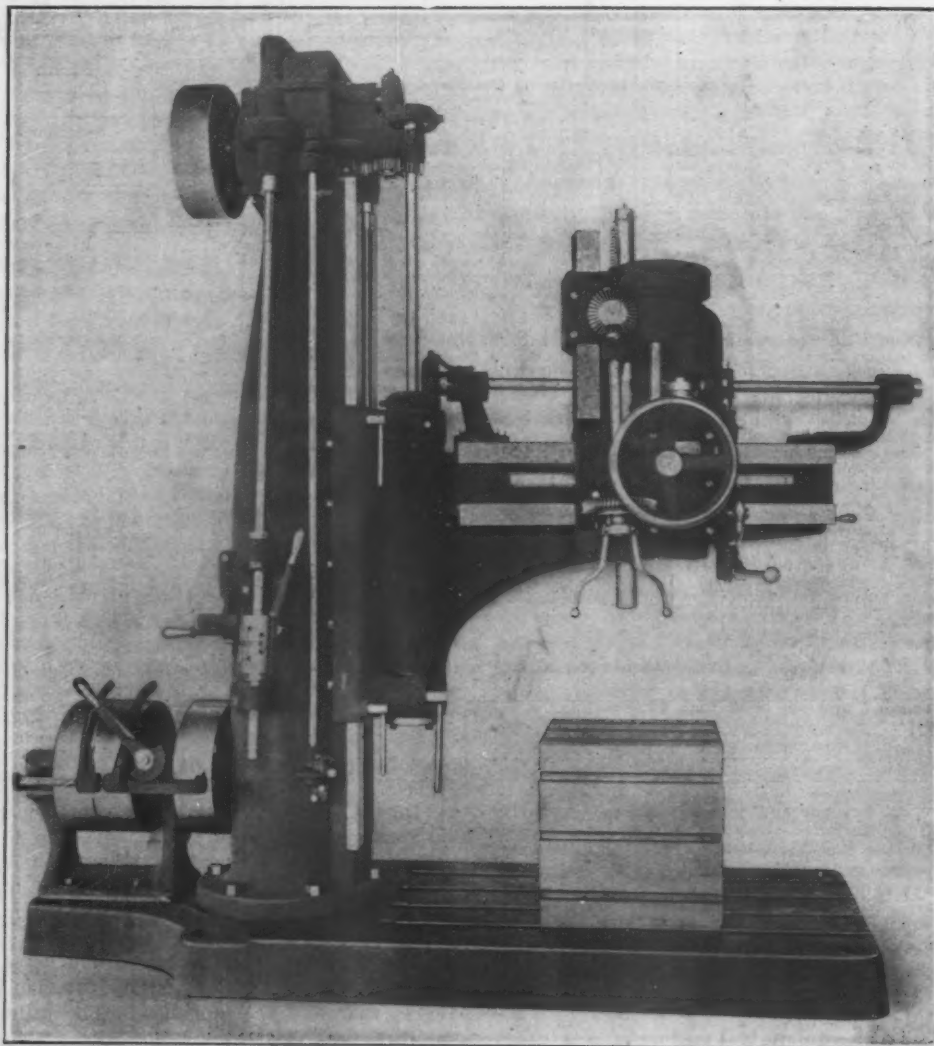


Fig. 1.—The Improved Triple-Gear Radial Drill Built by the Western Machine Tool Works, Holland, Mich.

tion. In the latter will be seen the self-oiling countershaft, which is located on the base of the machine at the back of the column. Both countershaft bearings are self-oiling, having individual oil reservoirs containing enough oil for about a year's running. The loose pulley of the countershaft is also self-oiling, and is of single piece construction. The oil reservoir in this case is cored out around the bearing, and this space is filled with cotton and oil. These bearings, as shown, have a groove cut in each, in which is laid a wick, with its ends dipping into the reservoir below. Another feature of the countershaft is plainly shown in Fig. 1, that is, the belt shifter previously mentioned. This arrangement of a rack and sector permits such an effective leverage that the pressure of one finger is sufficient to shift the belt. If motor drive is desired on this machine a constant speed motor may be mounted on the base in place of the countershaft, and belted to the pulley on the gear box at the top of the column.

Fig. 2 also shows a cross-sectional view of the gear

has a spur gear keyed to it, which engages with a rack that shifts the cone of gears to present any one in line with the intermediate gears. Thus, when the lock pin lever (the one at the left of the speed barrel) is disengaged, and the speed barrel is raised to its central position, the intermediate gears on the rocker arm are disengaged. The revolving of the speed barrel by means of the right hand lever causes the spur gear on the other end of the rod to act on the rack. The rack carries a pair of fingers, which shift the position of the cone of gears, and thus a new gear is brought in line with the rocker arm. Then, with the raising or lowering of the speed barrel, the lock pin enters one of the holes on the speed barrel and holds the rocker arm in position to give the proper mesh of the driving gears. The rocker arm and the gears at either end of it run free, while the other gears are keyed to their respective shafts. The gear box is filled about two-thirds full of oil, and all gears and shaft bearings run in an oil bath.

From the speed box power is transmitted through

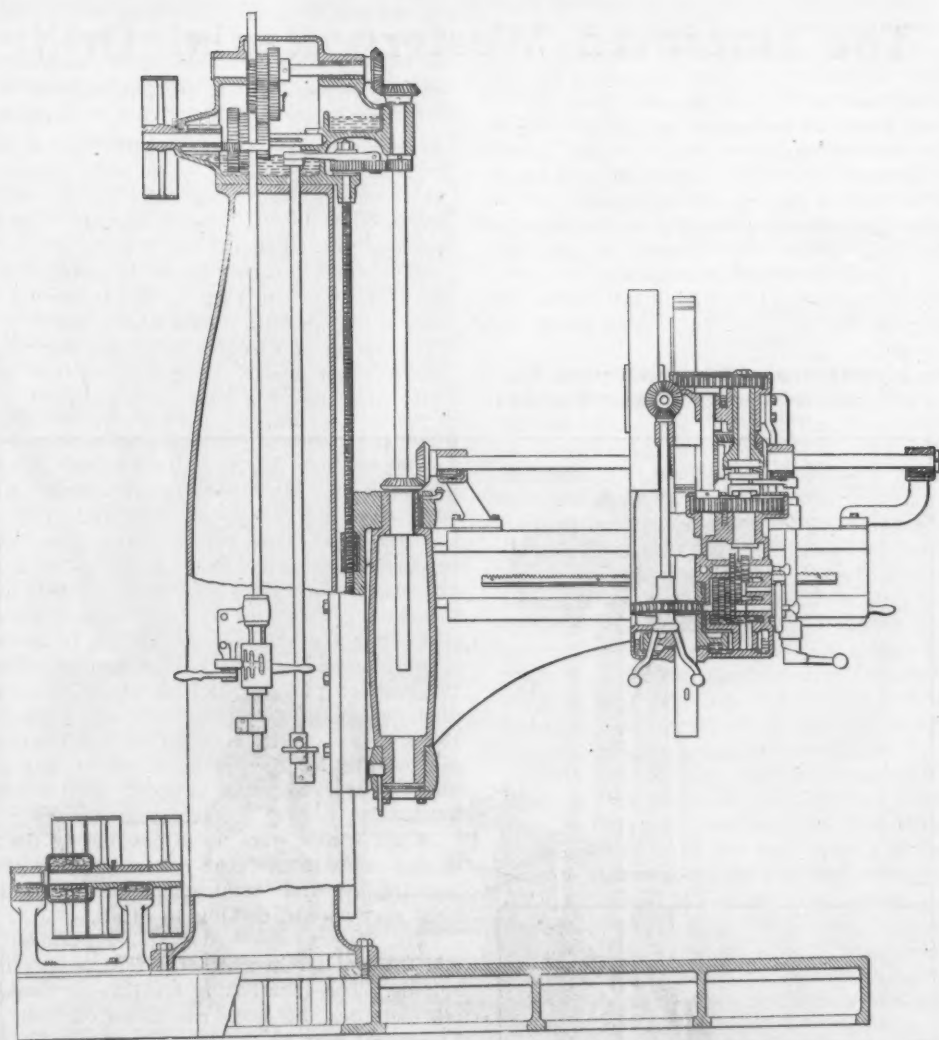


Fig. 2.—Elevation of the New Western Radial Drill with the Countershaft, Speed Box and Head in Section.

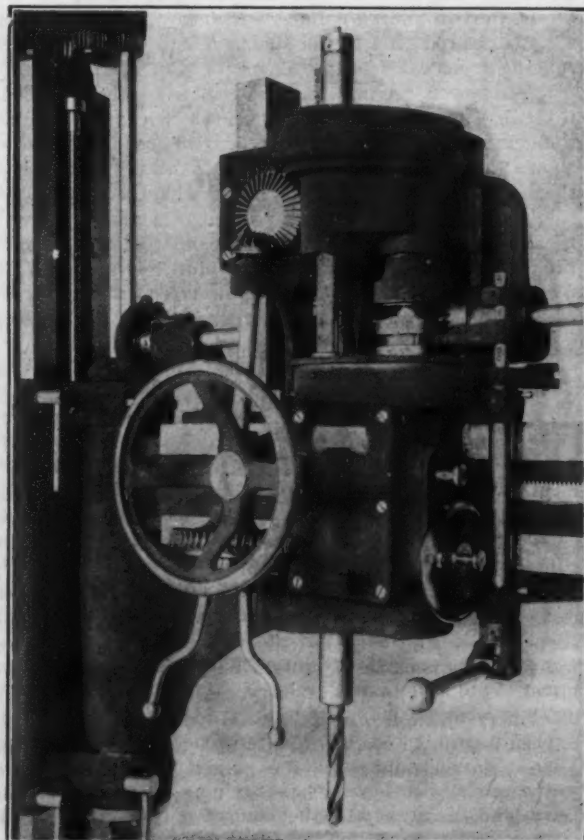


Fig. 3.—A Detail View of the Head.

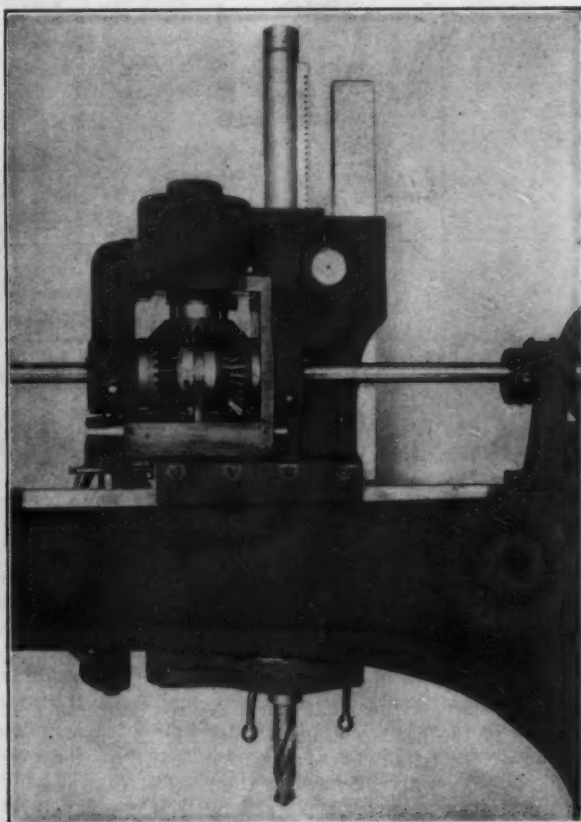


Fig. 4.—A Rear View of the Head.

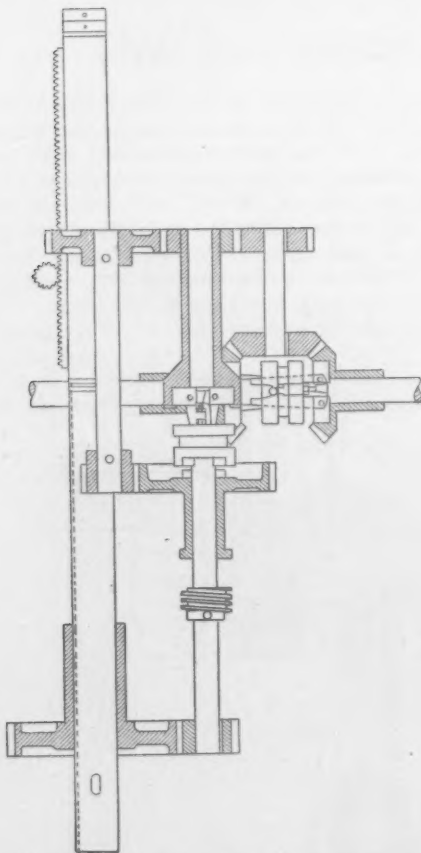


Fig. 5.—The Triple-Gear Arrangement.

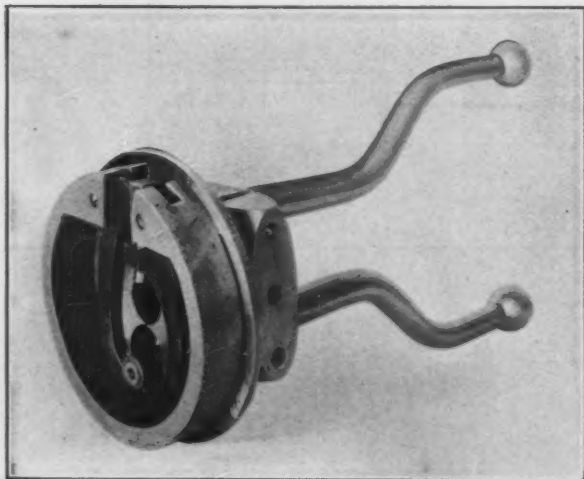


Fig. 6.—Detail of the Clutch in the Worm Gear Controlling the Feed.

two sets of bevel gears to the horizontal shaft on the top of the arm. A set of tumbler gears meshing a pinion on the top of the elevating screw and a spur pinion on the upper end of the vertical power transmission shaft make it possible to raise and lower the arm under the control of the lever on the column acting through the rod at the right of the speed barrel rod, as shown in Fig. 1. As shown in the sectional drawing of the machine, Fig. 2, the arm rests and turns on ball bearings, making easy and quick adjustment of the arm possible. The provisions for oiling in this part are also to be noticed.

The large view of the head, Fig. 3, gives a good idea of the strength of the casting. Webs of large proportions are used, giving that much desired stiffness and strength of the head castings. From Fig. 2 a clear conception of the triple geared arrangement of the head is to be had. This arrangement of the head gives a greatly increased transmission of power and a wider range of spindle speeds. The starting, stopping, back gears and tapping device are all controlled by one handle, making it possible to change from one to the other instantly

and safeguarding against using two at the same time. In this sectional view may be seen each set of gears of the triple geared arrangement of the head, in their respective casings, which are partly filled with oil. All gears run in an oil bath, giving a minimum amount of wear, smooth running and maximum power transmission.

The power has been traced to the horizontal shaft on the arm. From this shaft three mitre gears, shown in Fig. 4, and a friction clutch transmit the power to the head proper, and make up the reversing mechanism. The power goes to the first set of gears, and, when the friction clutch is up, the drive is direct through the third set of gears down close to the drill. When the clutch is brought down the drive is through the second set of back gears, and thence to the spindle. This is termed the back gear position of the clutch, and the whole triple geared arrangement is brought into action. An inspection of Fig. 2 will make this clear.

Fig. 2 also shows the low hung drive, which has the advantage that the spindle is driven at its larger diameter and down close to the work. The torsional strain exists only through a short length of the spindle, whereas usually radial drill spindles have their quills between the driving gear and the work, which necessitates cutting down the size of the spindle in the place where it most needs to be of large diameter. The spindle of the Western radial drill is of about 40 per cent. greater diameter in the section subject to torsional strain than the spindles of radial drills of the usual construction, the twisting length only about one-seventh as much, and the torsional resisting moment nearly three times as much.

Eight speeds were made possible by the arrangement of the gears in the gear box at the top of the column. The triple geared arrangement of the head gives eight back gear speeds, making 16 in all.

Fig. 2 shows the feed gear arrangement in the head, and the manner in which the feed is transmitted to the spindle. The gear box is filled about two-thirds full of oil, and thus the gears run in an oil bath all the time. The spiral gear on the top cone of gears in the feed box engages with the spiral gear on the shaft directly behind (the spiral may be seen in Fig. 5, showing the triple geared arrangement). The different gear ratios are obtained by two sliding splines, which key the proper gear for the desired feed to the shaft. There are eight feeds, ranging from 0.008 to 0.06 in. per rev. of the spindle.

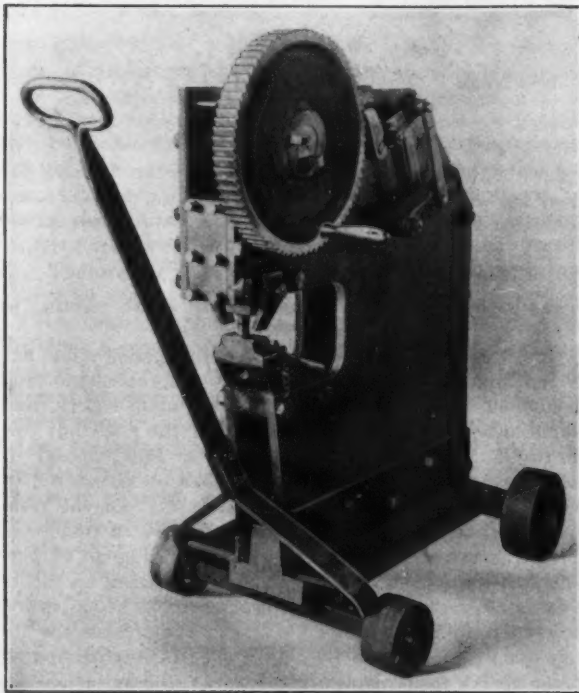
The power feed is transmitted from the feed box through a worm to a worm gear, which contains a friction clutch. By pressing together the pendant handles shown, which operate a toggle-joint, the friction ring of the clutch is expanded, thus giving a powerful grip, but easily operated. An adjustable wedge is placed between the two fingers, as shown in Fig. 6, to tighten or loosen the grip, as desired. The friction clutch is keyed to the feed rod, thus transmitting the power feed through a set of bevel gears to a spur pinion gear between the counterweight and the quill, and thus acting on the spindle.

The Western radial drill is built in four sizes, 3, 4, 5 and 6 ft. respectively. It is declared to be a drill well suited to a wide range of heavy work, and especially adapted to pipe tapping.

Ferro Marine Engines in Heavy Demand.—Finding that an output of 30 engines a day is not "going fast enough" to keep up with orders, the Ferro Machine & Foundry Company is obliged to add to its factory in Cleveland, Ohio, already claimed to be the largest marine engine plant in the world. A three-story machine shop is now being erected which covers an area of 140 x 160 ft. This machine shop will be one of the most completely equipped in the country. All the latest modern machinery and tools, including individual electric drives, will be installed. Coat closets and lavatories, as well as many other conveniences for employees, will be provided. A dining room 40 x 140 ft. is also being built for the use of employees. A basement 80 x 140 ft. will be fitted up for storeroom purposes. No expense is being spared to make the structure in every way a model factory building.

A Buffalo Hand Power Punch.

The No. 30 hand power punch illustrated herewith and manufactured by the Buffalo Forge Company, Buffalo, N. Y., is adaptable for all kinds of punching on



A Powerful Hand Punch for I-Beams and Channels, Made by the Buffalo Forge Company.

I-beams from 5 in. up to 12 in., or the equivalent in other structural shapes. It is extremely light and durable for its power, by virtue of the armor plate frame, which is claimed to combine great strength and rigidity. Medium sized holes can be punched easily and quickly in plates of thicknesses up to $\frac{1}{2}$ in. The maximum capacity of the punch is 1-in. holes in $\frac{1}{2}$ -in. plate, which would take a dead weight of over 47 tons upon the plunger, based upon a shearing strength of the material being punched of 50,000 lb. to the square inch, which is equivalent to the ordinary steel used in bridges and structural steel work.

This high power is made possible by a combined three-stage lever motion, which has a leverage of 1 to 2200 from the end of a 6-ft. lever to the shearing edge of the punch. This is equivalent to 2200 lb. pressure at the punch with 1 lb. pull on the lever; but does not include the power lost in friction of working parts, which is stated to be small for a machine of this kind. The two-frame plates are rigidly bolted and riveted together in a box form construction. The ratchet wheel is cut and hardened steel upon which works the pawl and lever motion. The lever bearing studs are bolted through the frame, making them extra rigid, and there are three pins in the lever handle over which the first link is placed to secure a one, two or three tooth movement of the ratchet wheel. The ratchet wheel can be turned by a convenient handle to quickly adjust the punch to the work, as well as to run the punch up after completing an operation.

The plunger crankshaft upon which the ratchet wheel is pressed is securely supported by flanged bearings bolted to the main frame. The throw of the crankshaft is $\frac{3}{4}$ in., and the motion is transferred to the plunger head by a heavy steel one piece connecting rod, which has a width of the frame space, and is bored from the solid and bronze bushed. The planed sides of the frame form guiding surfaces on two sides of the plunger, while the

main guides are bolted between the frame and have adjustable gibs, which assure permanent alignment of the punch and die. The die holder is a steel casting of improved shape and design adaptable to working on webs of channels, I-beams, &c. It is mounted on the frame and bolted by an extension machined to fit the frame space. Heavy angle irons are riveted to the frame on both sides, making a substantial base plate.

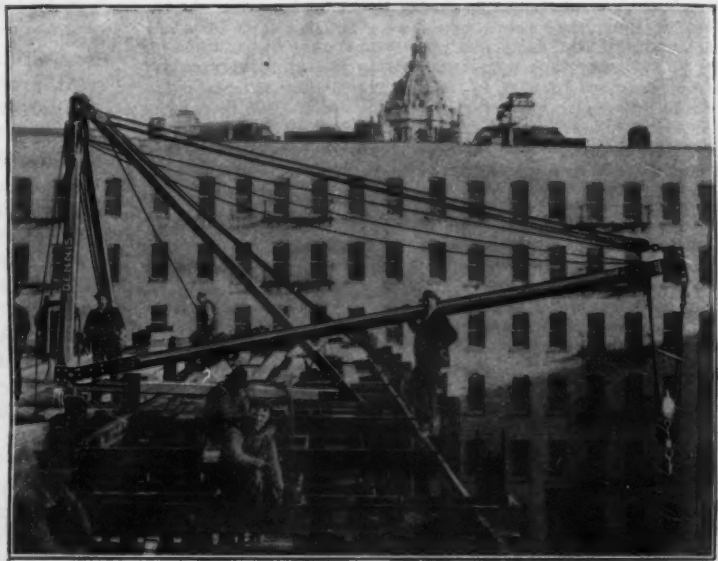
The weight of the machine is 1000 lb., and it can be mounted on a truck as in the illustration to make it portable.

The New Dennis Derrick.

The Dennis derrick, a new type of stiff leg derrick especially adapted for setting iron work, has been developed by the New Jersey Foundry & Machine Company, 90 West street, New York City. For stone setters' use the derrick is similarly constructed, with the exception that the mast is made of steel channels, allowing the hoisting crab to be located on the long stiff leg.

The short stiff leg and sill are hinged to the top and bottom gudgeons, allowing them to swing through the long stiff leg and sill, so that the derrick can be made either right or left hand or collapsed in order to pass through a narrow space when changing position. Change from right to left hand can be accomplished easily in about 10 min. The long sill is fitted with a broad flanged wheel at each end, allowing the derrick to be rolled readily from one position to another.

The stone setters' derrick is made up with a short mast, so that it can be used between floors of buildings. The iron workers' derrick, it is claimed, has been found to do from 40 to 75 per cent. more and the stone setters' derrick from 50 to 100 per cent. more than the usual Ginnywink and Breast derricks, which it is designed to replace. The derricks are entirely self-supporting, with the exception, of course, that it is necessary to use guys when shifting position. The derrick is declared to cost but little greater than that of an ordinary stiff leg der-



The Dennis Contractors' Derrick, Made by the New Jersey Foundry & Machine Company, New York.

rick, and to enable the contractor to do, on the average, fully 50 per cent. more work.

The Connellsville Central Coke Company, Empire Building, Pittsburgh, is having built at its Herbert Works in Fayette County, Pennsylvania, 100 new longitudinal coke ovens, which, when completed, will give it a total of 200 ovens. It expects to get as much coke out of these 200 ovens as it gets from its 250 beehive ovens which it operates at its low phosphorus plant, also in Fayette County. The company recently secured large contracts for furnace and foundry coke for shipment over the last half of the year.

The Conservation of Natural Resources.*

The Achievements of Engineers in Lessening Waste.

BY JAMES DOUGLAS, NEW YORK.

In discussing the waste upon which hinges, or is supposed to hinge, so largely the preservation of our national resources, the conclusions reached would be more reliable if actual experience were consulted, and fewer deductions were drawn from general statements, which are often the product of the imagination.

A Good Reason for Waste in Coke Making.

It cannot be questioned that the value of by-products has not been sufficiently appreciated by us, and that our tardiness in recovering the useful ingredients of the escaping gas of our coke ovens is one of the most glaring instances of shortcoming in that direction. And yet even for that sin there is some palliation in the immature condition of affiliated industries. I presume that it is admitted, without argument, that, except under very exceptional conditions, all the elements cannot be recovered from most of the ores or natural products which we treat. While it is a shame that the by-products from our coke ovens should be dissipated, Edward W. Parker's report to the United States Geological Survey for 1906† supplies a fairly good excuse in justification of this appalling waste. He says (pp. 773 to 774):

What has been already commented on in previous reports about the slowness of manufacturers to change from the better known but wasteful beehive practice to the by-product recovery of coke manufacture is particularly emphasized in the statistics presented in this chapter. For it would appear from the table following that the construction of by-product ovens had about come to a standstill, especially when the records for the preceding five years are taken into consideration. At the close of 1901, when there were only 1165 by-product ovens completed in the United States, there were 1533 in course of construction, 498 of which were completed during the following year. At the close of 1902, 1346 retort ovens were building, 293 of which were added to the completed plants in 1903. At the close of 1903, 1335 new ovens were building and 954 of these were put into blast before January 1, 1905, at which time 832 new ovens were in course of construction. At the close of 1905 there were only 417 new ovens building, and at the close of 1906 new work was limited to 112 Otto-Hoffmann ovens, which were being added to the 260 ovens already built at Johnstown, Pa., by the Cambria Steel Company. These new ovens were completed and put in blast in February, 1907.

This condition is somewhat difficult to understand when the economies effected by the use of retort ovens have been so clearly demonstrated. These economies consist not only in the higher yield of coal in coke, but in the recovery of the valuable by-products of gas, tar and ammonia. One of the reasons that has been assigned for the comparatively retrogressive condition exhibited by the statistics for 1905 and 1906 (comparison being made with beehive oven construction, 5893 new beehive ovens having been completed in 1906, with 4407 building at the close of the year) is the lack of a profitable market for coal tar, and yet the United States is importing coal-tar products to the value of several million dollars annually, while the development of the fuel-briquetting industry has been held back because of the lack of assurance of a steady supply of coal-tar pitch for a binder, and users of creosoting oils for the preservation of timber complain of an insufficient domestic supply of this product of coal-tar distillation.

The truth is that one branch of industry is so dependent upon another that there must be equal progress along the whole line of industrial life if complete recovery of all the available elements of our natural resources is to be effected. The chemical industry must keep pace with the mining and metallurgical industry. We may be moving too slowly in that direction, but we can distinguish a steady movement toward this needful co-operation. It is encouraging, for instance, to find that the waste gases from the furnaces of the Tennessee Copper Company are being turned into sulphuric acid for the manufacture from Southern phosphates of the superphosphates which the fertilizers of the Southern cotton fields need. Failing this mutual relation between the

metallurgist of Tennessee and the chemical manufacturer, the blame should not rest entirely upon the metallurgist for wasting that for which, heretofore, he has been unable to find a market. The same justification exists abroad as in this country for similar waste in other branches of industrial activity.

Legal Compulsion Responsible for Some Saving of Waste.

It is nevertheless true that legal compulsion alone has driven manufacturers to introduce improvements and economies which were demanded by public safety, and which have redounded to the benefit of the reluctant corporations. In Germany and England the disposal of noxious vapors and noxious liquors has been required of the manufacturers, but their compulsory removal from the atmosphere and the water has resulted in their conversion into useful products and the building up of new technical industries. An agitation is springing up in the West against the fumes from smelting works being turned loose into the atmosphere. While in some cases the injury done to vegetation may have been falsely attributed to the smoke from metallurgical works, the agitation has been followed by some good results. For instance, the Mountain Copper Company, having been driven out of Shasta County, Cal., by the farmers, has erected chemical works as an annex to its smelter at Martinez, on San Francisco Bay. Here, as elsewhere, manufacturers are reluctant to go to the heavy expense involved in abating such nuisances, even though they may know that in the end the abatement will be profitable. As far back as 1881 Mr. Vivian admitted that in recovering 47 per cent. of all the sulphurous acid emitted from his furnaces in Swansea he condensed 3666 tons of oil of vitriol as a great profit. This valuable asset, though he does not so state, was secured in spite of bitter opposition on the part of those who were ultimately the most benefited by it. One looks with wonderment at the clouds of valuable fumes which float from the New Jersey shore over Staten Island to the sea, instead of flowing inland as acid to the chemical manufacturers in the neighborhood.

Our industrial development, however, has reached such a state of advancement, especially in the densely populated portion of the country, that, however averse some of us may be to expend a large share of our profits in improvements, designed primarily to relieve the public of nuisances, we must submit whether we will or not. And having obeyed the mandate of the law not many years will elapse before we come to realize that what we do under compulsion is as much for our own good as for that of our neighbor.

What Has Been Done in the Copper Industry.

I promised, however, to confine myself in my remarks to matters of experience. I have been identified with the copper interests of the Southwest since 1881. Though the Southern Pacific Railroad had only just traversed the territory, mining was immediately stimulated by railroad transportation, and the Copper Queen Company at Bisbee, the Old Dominion Copper Company at Globe and the Lezinskys (the predecessors of the Arizona Copper Company, as well as the Detroit Copper Company), were actively at work at Clifton. All three of the most productive districts, therefore, of southern Arizona were being explored, and, through the influence of the railroad, vigorously exploited at that time. But none of them were situated on the main line, or were linked to the trans-continental road by branches. The Copper Queen was 60 miles from its nearest railroad station, Benson; the Old Dominion was 140 miles from either Wilcox or Bowie, and the mines of the Arizona

* Read at the New Haven meeting of the American Institute of Mining Engineers, February, 1909.

† "Mineral Resources of the United States for 1906," United States Geological Survey (Washington, 1907).

Copper Company and the Detroit Copper Company were 80 miles from Lordsburg. Coke and supplies had to be hauled in and copper teamed out those long distances.

The ores in all three camps were thoroughly oxidized. At the time this was supposed to be a condition of the highest advantage, upon which the only possibility of economical treatment depended; and not without good grounds, for the tedious methods of treating sulphide ore, so expensive in labor and fuel, were still practiced. We all, therefore, imagined in our shortsightedness that the day of doom for the copper interests of southern Arizona would date from the transition from oxidized to sulphide ore. Of the three districts the only prosperous one during the succeeding 15 years or so was the Warren, and for reasons which we now more clearly appreciate than we then did.

The ores of the Copper Queen, or rather such of them as were then selected for treatment, were self-fluxing. They contained about 10 per cent. of copper. The slags of that period, which we are now resmelting, contained about 2.5 per cent. of copper. Assuming the slags to represent 65 per cent. of the charge, about 16 per cent. of the total copper content was being stored away in them. Less favorable conditions, however, existed at both Globe and Clifton. The ores of both these districts were extremely siliceous, and the furnace charge of ore had to be diluted with from 40 to 50 per cent. of limestone. The siliceous ores as treated were probably of about 12 per cent. The furnace charge was reduced by fluxing to between 7 and 8 per cent. of copper. The old slags—65 per cent. of the total charge—yield at Globe about 3.5 per cent., and, therefore, must have carried from 30 to 32 per cent. of the total copper fed into the furnaces. We have re-treated all the old slags of the Detroit Copper Company at Morenci, near Clifton, and know that they carried on an average 4.5 per cent. of copper, and must, therefore, have contained at least 40 per cent. of the copper in the ore. At neither Clifton nor Globe was the dust collected, which probably represented a loss of another 5 per cent. Considering the high cost of fuel and labor, it is not to be wondered at that neither the Old Dominion Company, the Arizona Copper Company nor the Detroit Copper Company was financially successful for the first 15 or 16 years of its existence. It was not until all the richer carbonate ores had been wasted by being largely converted into slags that the companies recognized that their salvation depended upon securing sulphide ores; upon making metallic copper through the medium of matte, and throwing away less copper in their slags. So little, however, was this fact appreciated at first that we all envied the Arizona Copper Company because it could turn the San Francisco River into its works and granulate and wash away this valuable refuse. And when the Old Dominion mine struck large volumes of water the Old Dominion Company committed the same act of folly, washing its 3.5 per cent. slags into Pinal Creek.

Had the companies realized the losses they were incurring and the only remedy applicable they would have been obliged to close both mines and furnaces; for, except at the Copper Queen, where sulphide ores were encountered within three or four years after the mine was opened and were considered a nuisance, heavy sulphides are elsewhere rare. Though the Old Dominion Consolidated Company has explored its property to the sixteenth level, between 100 and 200 tons daily are imported from California and Bisbee, the company's own mines producing only about 60 per cent. of the sulphur required by the furnaces. And at least one of the Clifton smelting companies is obliged to draw from abroad by railroad about 160 tons daily of sulphides high in sulphur and low in copper. It follows, therefore, that there was no alternative in the early days between either suspending operations or making copper in the wasteful manner which the companies then pursued.

Advantages and Disadvantages of Adversity.

Looking at the situation from the standpoint of to-day, if we place the advantages and disadvantages side by side, we have on the side of the advantages:

1. The experience which was gained during that long

period of adversity, which is now being turned to good account, not only by the original companies, but by the many other enterprises which have entered the same field and are profiting by the losses of the pioneers.

2. The southern portion of the territory has increased in population and in wealth, mainly through the exertions of these copper companies, even while they were losing money on the copper produced. They not only employed thousands of men, but they made a market for the agricultural development of the small amount of arable land within reach of the mines. Had the mines of Globe and Clifton not been operated because peculiarly unsuccessful, and had not the shareholders been willing to accept hopeful promises in lieu of dividends, Arizona would not to-day be making an unanswerable plea for admission to the Union as a State.

3. The ultimate success has been due to the advent of the railroad; for railroads are seldom built into unproductive regions in the expectation of creating traffic that does not exist.

If we turn to the disadvantages they are, of course, palpable. At the present time, when we are matting our copper ores instead of making black copper direct, the slags from those three groups of copper furnaces run from 0.4 to 0.5 per cent. of copper. Even when the slags are re-treated, copper in the slags resulting from the slag treatment runs higher than in slags from the treatment of ore, owing to the difficulty of reducing silicates. Thus, when the slags are re-treated, there is the double waste of fuel and the double waste of labor.

Even supposing that our economic system were different and that necessity did not drive public corporations to utilize wastefully the resources they acquire, I think that the balance of advantage to the country at large, as well as to the district, would indicate that it is better to make progress and thereby gain experience, even at the expense of such waste as I above indicate, rather than stand still and do nothing in the hope of more favorable conditions being brought about by Providence rather than by our own efforts.

Nothing Containing Material of Any Value Should Be Thrown Away.

Certain lessons, however, the above recital of experience teaches. One of them is never to throw away anything that contains material of any value, even though it may seem to be valueless. The time inevitably and invariably comes when, through improved conditions or better methods, what was waste to one generation becomes of value to another. Most of the filling of the old stopes in the Copper Queen mine and in the Old Dominion mine has already been re-treated. In the case, therefore, of sulphide ore, which is too lean to handle, it should be stored underground rather than exposed to the weather at the surface. I am not sure whether we are justified in ballasting our railroads with the slags which we are making now, lean as they are. One cannot see how 0.5 per cent. of copper and a little gold and silver can possibly be recovered to any advantage, and yet the future may reveal secrets which will convert such impossibilities into possibilities. The slags from the iron blast furnaces, which were deemed valueless a generation ago, are made into hydraulic cement to-day.

We all recognize the waste that has resulted in the past from washing away gold tailings, which often ran several dollars in gold to the ton. Had they been impounded the minerals now, through weathering, would be in the fittest possible condition for cyaniding, and would give up to this process their residual values to within a trifle of their contents. The same rule of preservation should be applied to the tailings from copper works. The sulphides, no matter how small their percentage, slowly decay, and give off their copper as soluble sulphate, which can be precipitated on scrap iron at a very inconsiderable cost. If the locality be such that these waste materials can be stored, care and some outlay, if necessary, should be expended in their preservation.

There seems, however, to be a fascination in contemplating loss rather than saving, and while we cannot exaggerate the follies of waste it is not fair to the pro-

fession to overlook the efforts that have been consistently made within the last three-quarters of a century, and are still being made to eliminate waste. One of the anomalies, however, of the problem is that the accused mining and technical engineers compose the only section of the public which really appreciates the cost of waste and tries to save.

The recovery of heat units in our domestic fireplaces and furnaces is far less than the recovery of heat from coal burned under our best boilers, when measured as power generated in our steam engines. And the waste in our kitchens and at our tables involves a greater national loss than the waste in our coal mines. In the one case the people at large are making no effort to minimize it, while every technical man of repute is putting his best endeavors into devising means of getting the highest efficiency out of nature's forces, with a view to turn nature's resources indirectly to the greatest good for the greatest number.

Technical Men Too Harshly Criticised for the Waste Going On.

If we look backward to what has happened within our own day and experience, we may justly feel some resentment at the harsh criticism which is now being so generally aimed by the press and the public at technical men. And this is partly true likewise of the strictures so indiscriminately passed upon the corporations which are instrumental in developing the country's natural wealth.

In the middle of the last century less than one-half of the iron made in this country was smelted with anthracite, and the balance with charcoal or charcoal and coke.* The devastation of the forests was awful. Pearse† gives the consumption of wood in Berks County, Pa., in making 19,000 tons of charcoal iron in 1828, 1829 and 1830 at 250,528 cords. To secure this amount about 8000 acres of the finest forest land in the country must have been stripped. In England, where most of the iron was made with coke as fuel, at the same date and until 1875, there were consumed from 35 to 37 cwt. of coke per ton of pig iron. In 1875, when the Whitwell stove was introduced to heat the blast, the quantity of fuel consumed was reduced by 3 to 4 cwt. By improved mechanical and metallurgical appliances that consumption in the Middlesbrough District is now lowered to 22 cwt.‡

This saving of fuel in the blast furnace has in this country as well as in Europe been effected through the sleepless activity of metallurgists and engineers by modifying the size and shape of the great iron stacks, increasing and regulating the temperature and the pressure of the blast, and by the introduction of appliances for utilizing the waste heat. The difference between the 37 cwt. of coke formerly needed to make a ton of pig iron and the 22 cwt. now consumed, multiplied by the number of tons of pig iron made in the United States in 1906, represents a saving (assuming 1.75 tons of coal as required to make 1 ton of coke) of approximately 30,000,000 tons of coal.

Fuel Saving in Blast Furnace Practice and Steel Making.

The progress along this line in blast furnace practice has been steady and wonderful, and has culminated in the ingenious device of James Gayley, which still further economizes fuel by freezing the blast before admitting it to the stove in order to eliminate moisture, and thus supply the stack with a gaseous element of as constant and reliable a composition as the solid elements of fuel and ore.

The advances in blast furnace practice in the direction of fuel saving have been great. But they are not as startling or as picturesque as the economies which followed the introduction of the pneumatic method as applied through the mechanical and metallurgical skill of Bessemer, and as developed in the United States through the genius of Holley. We can all recollect the distressing

sight, especially in summer weather, of the puddler, stripped to his waist, toiling over his furnace, while burning up from 20 to 27 cwt. of coal in converting 1 ton of pig iron into puddle bar. Leaving out of the question the fuel used in generating the power for operating the Bessemer converters, which, however, is generally recovered from the waste heat of the blast furnace, the amount of coal saved in making Bessemer steel instead of wrought iron during the same year of 1906 exceeded 22,000,000 tons.

The metallurgy of copper has benefited as acutely as the metallurgy of iron and steel from the combined science and skill of the mechanical and metallurgical engineers. One recalls distinctly how in the old brick furnace a campaign of 10 days, with a daily charge of 10 tons of ore, was looked upon as almost phenomenal; and that from the time we began roasting sulphide ore in heaps until the refined copper was turned out after endless handlings of the mattes, as they were worked up from lower to higher grades, about three months was occupied. Now by means of mechanical roasting furnaces large jacketed cupolas, electrical cranes, the Bessemer converter and the Walker casting table the ore is turned into metal in fewer hours than it formerly took weeks, and at the same time almost despoising with hand labor.

Achievements of the Electrical Engineer.

While these industrial changes were going on in the mining and metallurgical fields, the electrical engineer was bringing under control that tremendous force which Faraday investigated as dynamic electricity; and we metallurgists have not been slow to apply it, both to the saving of fuel and other natural resources and to the conservation of human labor. The modern rolling mill, in which a motor replaces the small engine and boiler that used to operate the rolls, and the modern electrolytic plant, which turns out electrically pure copper, are only the more visible benefits that electricity is conferring. When some of us commenced our technical experience, the deduction in precious metals made by the refiner of copper before any contribution was made to the miner or the seller was \$60 worth per ton of ore or metal. Under such heavy charges comparatively small amounts of gold or silver were or could be saved. Today, through the application of electrolysis to the metallurgy of copper, about \$8,000,000 in value, which was formerly lost, is now recovered annually and goes into commerce as a by-product; for the world's copper may be assumed to carry an average of \$10 per ton in gold and silver.

The last application of this mysterious force, by transmitting from stationary engines electric current for the movement of trains, aims at reducing what is certainly one of the most wasteful uses of coal—its consumption in the locomotive for the generation of steam. In distributing our coal supply the railroad burns up from 20 to 25 per cent. of the total production of our coal mines. This will be notably reduced, though to what extent has not yet been determined. But before this desirable consummation is attained if electrical engineers continue to extend the limits within which long distance transmission can be applied economically they will bring the latent, neglected forces of the whole continent to our doors, and the water powers a thousand miles away, as well as the winds and tides, will propel our railroad cars as well as heat our houses. The service which coal now performs will be fulfilled without the expenditure of human labor and the diffusion of so much obnoxious smoke and vapor. Long before our coal supplies are exhausted, even on the most pessimistic calculation, our children will gladly leave the balance in the ground, and charge off to profit and loss some of what we now consider our most valuable natural asset.

The Waste of Wood in Timbering Mines.

There is no doubt whatever that the destruction of our forests is attended by a host of such terrible consequences that a halt must be called. In the early days at Bisbee, when we were at a distance from the railroad, we of necessity almost stripped the hills of their scanty clothing of stunted wood, for we were forced to use wood

* In the *Iron Manufacturer's Guide* (1866), Lesley gives the total production in 1854 at 724,833 tons, of which 417,123 tons was charcoal or charcoal-and-coke iron.

† "Concise History of the Iron Manufacture," p. 156.

‡ A Description of Messrs. Bell Brothers' Blast Furnaces from 1844 to 1908, and other papers, *Journal of the Iron and Steel Institute*, vol. LXXVIII. (No. III., 1908).

for the generation of steam. I find from one of the earliest statements that the company burned about 4000 cords of wood for the year. The hills for miles around were completely denuded, with the result that disastrous floods have ever since almost annually deluged and damaged the town, which is built in the troughs of two converging valleys.

As mining engineers we are sensible of the ruin which reckless lumbering involves and we lower with regret every stick of timber that we bury under ground. Nor are we satisfied to bemoan the fact without making some effort to remedy the evil. It has been suggested and we are trying the experiment to replace wood by iron. The forests can be restored in time by reforestation, but iron ores cannot be replaced. And, therefore, it is a false economy to attempt to save a reproductive material by substituting one which rusts and cannot be regenerated. Concrete is also being used more and more in mining operations, and against its substitution for wood there can be no objection; but the most notable economy will result from improved methods of mining, especially from the introduction of the caving and slicing systems. These were introduced into the Cananea mines when Arthur S. Dwight was manager; and Dr. Ricketts and Mr. Kirk have extended the use of the methods and applied them so successfully that less than half of the timber is used per ton of ore extracted to-day than was buried in the mines three years ago. The following table, kindly supplied by Dr. Ricketts, represents the saving which is going on at Cananea and in many mines where the same method is applicable:

Timber Consumed Per Ton (Wet) of Ore Produced at Cananea, Mexico.

Period.	Tons ore mined.	Feet timber used.	Feet per ton.
August 1, 1905, to January 31, 1906.	463,039	10,774,342	23.27
February 1 to July 31, 1907.	554,473	8,268,682	14.95
August 1 to September 30, 1908.	97,510	1,091,837	11.30

While it would be presumptuous to pretend that, as a people, we are economical and to deny that, under modern corporate control of large national resources, the temptation under necessity of making large profits is not betimes stronger than the appeals which conscience makes to subordinate personal gain to the national welfare, I am sure that neither our largest mining and metallurgical companies nor ourselves, as their working agents, are recklessly indifferent to the preservation of those very materials upon which the wealth of the corporations and our own salaries depend. No large corporation would to-day use an old boiler and slide valve engine with a consumption of 6 lb. of fuel per horsepower hour in preference to a triple expansion cut-off engine which will do the same work with 1.5 lb. per horsepower hour, and so on through the whole gamut of operations which these large corporations conduct and which we, as their managers, advise them to adopt, because we believe them to be the best and most economical methods.

Professional Pride in Effecting Economies.

While public policy may not be the prime motive for saving, every thinking man in a large institution, from the manager downward, takes a pride in knowing that he is saving, and feels a sense of shame when he is conscious of wasting. And in economic life—I do not speak of social and domestic life—the rules against waste are becoming more and more rigid and are better enforced. The public outcry, therefore, against the large corporations for wasting the natural resources of the nation is unjust in so far as it fails to recognize what they have done and are doing in the direction of conservation, and inasmuch as it gives the working staff of these great corporations so little credit for the marvelous progress the world has made through their instrumentality. They have saved where formerly, through ignorance and inexperience, their predecessors were wasting. With more profound knowledge and better instruments for observation and investigation they are patiently unraveling nature's secrets and learning how to turn her forces to human uses.

I cited a case of the unavoidable waste of copper ore, of fuel and of human labor in the treatment of the oxidized copper ores of Arizona 20 years ago. The men

who were wasting acted upon their knowledge and skill. So now it often happens that, in response to the urgent call which modern society makes by fits and starts for enormously increased productiveness of various commodities, the demand can be met only at the expense of waste of nature's resources, of human energy and even of human life. If a more staple balance could be maintained between supply and demand; if the current of domestic and economic life would run more smoothly; if wealth were not accumulated so easily and spent so lavishly; if those marvelous improvements to which we have referred were not periodically made, which give these irresistible impulses to worldwide human energy, thereby bringing about these oscillations between hard times and good times, between labor dearth and labor surplus; if all these disturbing elements were obliterated, certainly there would be less waste, and possibly there would be more happiness. But it is not our part nor within our power, as mining and metallurgical engineers, to reconstruct society or renovate the world. Yet it is our duty to continue using our best efforts—whether the world recognizes our merits or not—to get the utmost energy out of human life as well as out of the inert material we handle—with the least possible exhaustion of human tissue and the smallest possible waste of mineral or vegetable material.

The National Machine Tool Builders' Association.

The National Machine Tool Builders' Association held its seventh semiannual convention at Milwaukee, Wis., May 25 and 26. Headquarters were established at the Plankinton House, where the three business sessions of the meeting were held. Of the 100 tool manufacturers comprising the membership of this organization a fair proportion was represented, but the largest part of the attendance was from the Middle and Western States. Practically all of the time was taken up with executive business, such as the reports of officers and committees.

At the closing session on Wednesday morning an address on machine tools for railroad shops was delivered by William Forsyth, in which he noted the growing tendency toward more economic practice in railroad shops and the demand for tools of greater productive capacity. It was also observed that here, as in commercial shops, the weight of metal removed in a given time is gaining recognition as a basis for the calculation of efficiency of cutting tools. Touching the present state of activity in railroad shops, the speaker stated that while there is yet wide room for improvement, the increased earnings of the roads give promise of more rapid strides ahead, which it is expected will soon close the gap of dullness left by two years of industrial depression. Several instances of actual and contemplated improvements calling for the purchase of extensive equipment were cited as evidence of the growing requirement for machine tools in this direction.

After final adjournment the members and visiting dealers made a trip in a body to West Allis, where the plants of the Allis-Chalmers Company and Kearney & Trecker were visited and inspected. Several members of the convention availed themselves of an invitation extended by Alfred Marshall, president of the Marshall & Huschart Machinery Company, Chicago, to join him in a week's outing at his summer home at Shore Acres, Wis. The party was composed as follows: William H. Reed, Chicago; C. Wood Walter, treasurer Cincinnati Milling Machine Company; B. B. Quillen, president Cincinnati Planer Company; Samuel H. Reck, president Rockford Drilling Machine Company, and Dr. Oliver Meckel, manager Baird Machine Tool Company.

The Pittsburgh Steel Company announces that it has discontinued its selling arrangements with Pierson & Co., New York, and has appointed Charles M. Porchier, a former member of the firm of Pierson & Co., manager of sales in the East, with headquarters in the Slinger Building, 149 Broadway, New York, where offices have been established.

The Murchey Improved Die Head.

In Fig. 1 is shown applied in the double head pipe and nipple threading machine built by the Murchey Machine & Tool Company, Detroit, Mich., an improved automatic opening die head. The head is composed of four principal parts, body, sliding collar, adjusting shell and die holders. The body is made of close-grained cast iron and is bored and turned accurately to standard size to make all of its parts interchangeable. Across the face of the body are milled T slots for carrying the steel die blocks. The outside flange of this part of the head is

is the means of positive, universal adjustment of the dies through the double wedge action on the bearing levers, as shown in Fig. 2. All parts above mentioned are machined outside and inside to obtain perfect balance of the assembled head.

The die blocks are of machine steel, case hardened and are accurately fitted to the slots in the die body to exclude chips and give extra long and durable wearing surfaces, which the maker claims is not possible where the dies only are the sliding members. A tempered steel bearing pin forms the back of the die slot and takes the thrust of the die or chaser. It is also the bearing upon

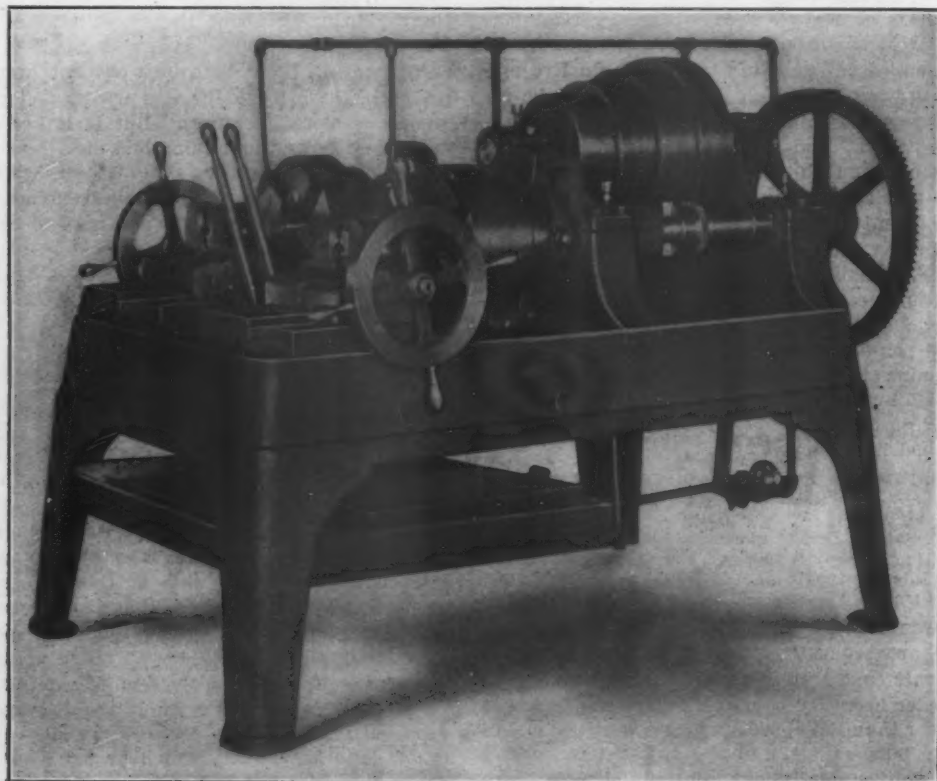


Fig. 1.—The Improved Automatic Opening Die Head Used in the Double Head Pipe and Nipple Threading Machine Built by the Murchey Machine & Tool Company, Detroit, Mich.

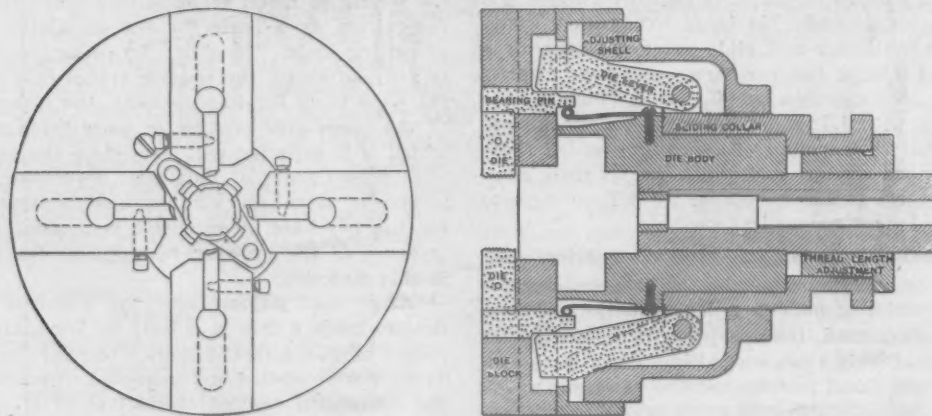


Fig. 2.—End View and Longitudinal Section of the Die Head.

machined at the back internally as a guide for the adjusting shell, and also serves to exclude chips from the working parts of the die head. The hub is bored and key-seated to fit the steel driving shaft, and upon the outside of it the sliding collar operates.

A part of the interior of the sliding collar is fitted to slide thus upon the hub and the remainder is threaded to receive the collar for adjusting to the length of thread to be cut. On the exterior of the sliding collar four lugs are milled and drilled to receive the fulcrum ends of the bearing levers, and a thread is provided upon which the adjusting shell is carried, and a recess to receive the shoe attached to the yoke for closing the die head. The adjusting shell carried upon the sliding collar at the back and guided within the flange on the die body at the front

which the tool steel bearing lever works. This bearing pin is a perfect fit in the die block, has a solid backing and can be removed readily when necessary. The bearing levers which are hung in the lugs of the sliding collar, are of tool steel, tempered at the point of bearing on the bearing pin and turned to give ample bearing on the adjusting shell. The dies also are of tool steel and have plain straight backs. Each is held firmly in position by a pointed set screw which enters a pit in the die, making it quick and easy to change sets when desired. The dies may be recut to original size three or four times before discarding.

The adjustment for light or heavy internal reaming is independent and may be varied as desired as shown in Fig. 3. Owing to the construction, the extra reaming

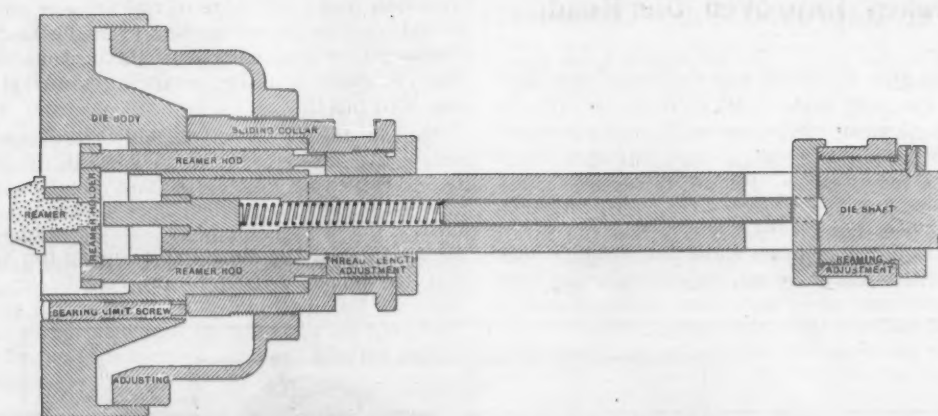


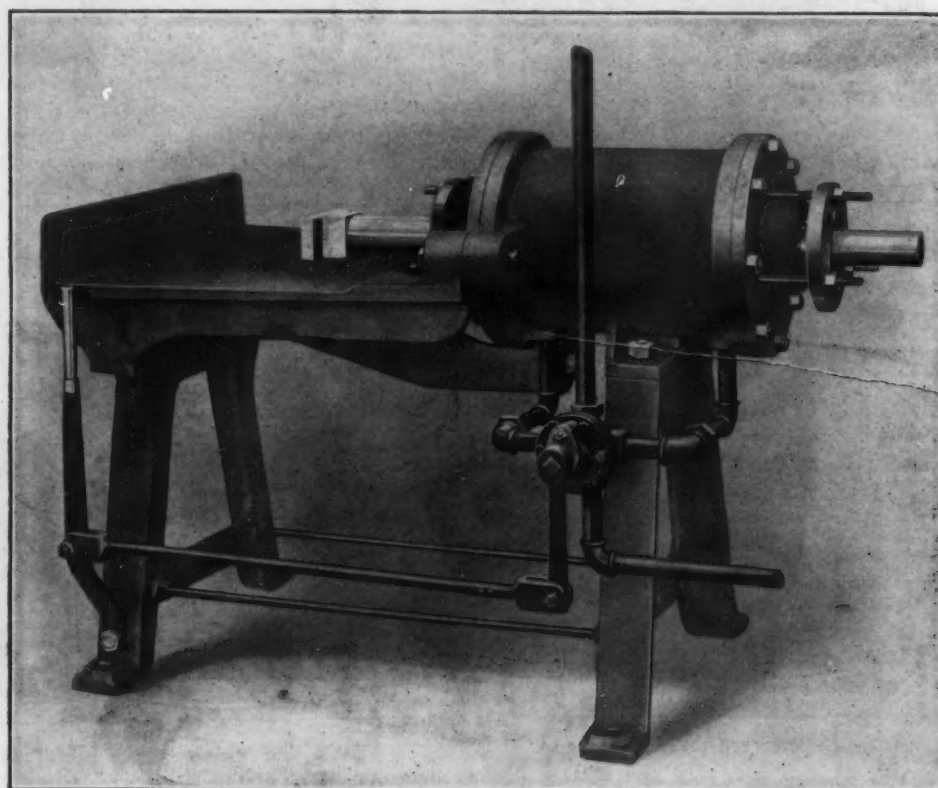
Fig. 3.—Sectional View, Showing the Action of the Reamer Rods.

tension that may be applied will affect the reaming only when the thread is well through the dies where the heavy reaming will not cause a thin thread. The reamer holder is malleable iron; part of its depth is squared to receive the square on reamer shanks. The reamers are held in place by a single pointed set screw. As may be seen in Fig. 3, the reamer rods, attached to the reamer holder, pass through long guide holes in the body of the die head, and coming in contact with the adjustable collar in the back of the sliding collar, push the bearing levers off the bearing pins, allowing the die blocks to be thrown open by the positive spring action when the thread length has been attained, as determined by the position of the thread length adjustment collar. To prevent accident the

from standard size. The head is considered to be remarkable for the absence of small parts, and particularly for the few wearing parts and strong simple construction.

A Carlin Horizontal Spring Tester.

The Thomas Carlin's Sons Company, Pittsburgh, Pa., is offering a horizontal spring testing machine shown in the accompanying illustration. It is declared to be a considerable improvement over the vertical type now commonly used, inasmuch as it facilitates handling the springs and is more readily adaptable to various types. It has a cylinder 12 in. diameter by 14 in. stroke, can be operated either by air or steam, and has a capacity of



A Horizontal Spring Testing Machine Built by the Thomas Carlin's Sons Company, Pittsburgh, Pa.

reamer rods are shouldered to strike the sliding collar, should the adjustable collar be too far out. When the die head is open the reamer holder with the rods may be drawn out, permitting long or running threads to be cut.

The adjustments for this die head are few, simple and quickly made in determining the three conditions necessary—size of thread, length of thread and any amount of internal reaming of the end of the pipe. The materials are claimed to be carefully selected and the workmanship to be of the best. To make interchangeability of all parts possible, jigs and gauges are used in the manufacture. It is easily possible to rejob dies in this die head on account of the extreme adjustment possible both ways

8 tons. This machine is also said to be a very convenient bulldozer for small shapes.

A consolidation of seven electric power companies and two trolley companies has been effected at Harrisburg, Pa., under the name of the Columbia Power, Light & Railways Company, with a capital of \$1,250,000. The new company takes over the Danville & Bloomsburg and the Columbia & Montour Electric railroads and electric companies in Berwick, West Berwick, Irondale, Bloomsburg, Danville and Nescopeck in several counties of the upper Susquehanna Valley. E. R. Sponsler, Harrisburg, is president.

The Stoever Improved Pipe Threader.

An improved pipe threading and cutting off machine, designated as the 1909 model, and built by the Stoever Foundry & Mfg. Company, Myerstown, Pa., has some new features which are interesting: Fig. 1 shows a No. 8 size machine having a capacity for threading and cutting off pipe from 2½ to 8 in. inclusive. The machine shown is belt driven, but can be readily changed to motor drive, using a constant speed motor. While the machine was formerly a relatively high speed, rapid producing tool, in the new model the speed has been increased and a number of new features have been added.

The former massive construction of the headstock

and steel pipe. The bore of the arbor is made sufficient in diameter to permit passing extra heavy 8-in. fittings, which is the maximum capacity of this size machine. The oil pump is of the rotary type, and is fastened to the main driving shaft, insuring a steady and constant flow of oil for all sizes of pipe, which means a great saving in the wear of the dies and ability of the machines to be speeded up for high speed cutting.

Fig. 2 shows the 1909 model patented sliding and floating die head. This head is arranged to slide on ways on the front of the die stand, allowing the head to move and accommodate itself to any eccentricity in the pipe, relieving the machine of a strain which is usually encountered on a rigid head and insuring perfect threads. It also permits the head to be pushed out of the way for

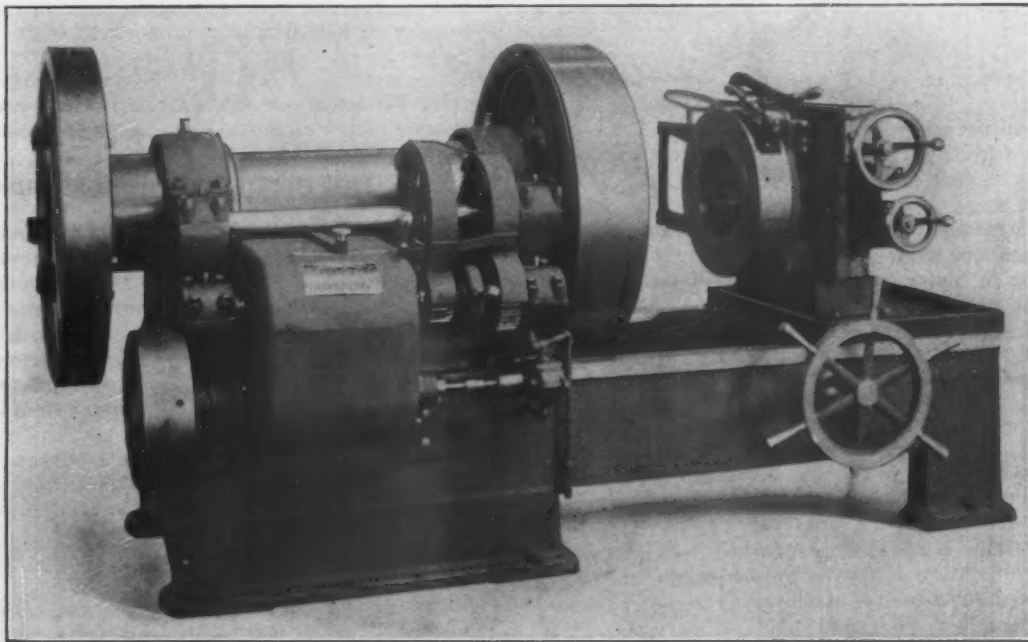


Fig. 1.—The No. 8 (1909 Model) Pipe Threading and Cutting Off Machine Built by the Stoever Foundry & Mfg. Company, Myerstown, Pa.

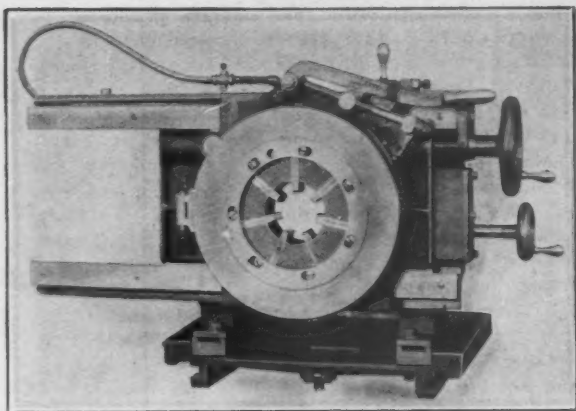


Fig. 2.—The 1909 Model Sliding and Floating Die Head.

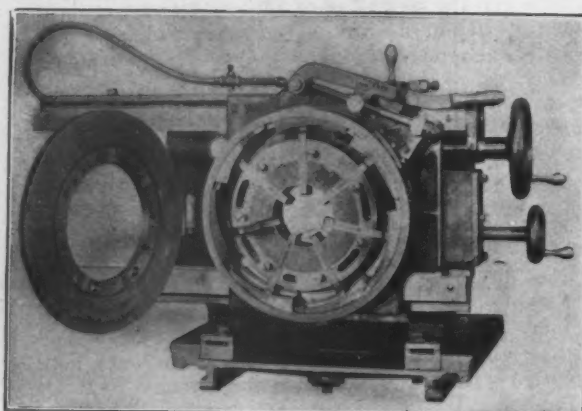


Fig. 3.—Another View of the Die Stand, Showing the Interior.

and beds has been retained, as well as the heavy three-jawed independent chucks on both the front and the rear spindle, the rear chuck being furnished in addition with flange grips for making up flanged work. These chucks, both the front and rear, are made in one piece, the slots for the slides being milled out of the solid. The internal driving gear and one piece casting headstock carrying all of the bearings have also been retained, with a few changes in design. This is an all geared machine, all speeds being obtained through gears cut from the solid, which are enclosed in an oil tight gear box, allowing the gears to run in oil and permitting the use of a single driving pulley, doing away with the old style cone pulley and the shifting of belts.

On this machine are given 10 separate and distinct speeds, provision being made for a separate speed for iron

putting pipe in the front or rear end of the machine without injury to the chasers. The die head can also be pushed out of the way and clear the front chuck, permitting a cutting off distance of 3 in. for nipple work. This is one of the new features peculiar to this machine. The adjusting mechanism for setting the chasers is very simple and easily operated. The hand knob for making the adjustments is directly in front of the operator, as is also the scale on the face of the cam ring. As the lever comes to rest on the screw, the straight line feature is secured and no digging into the pipe before the chasers are released is possible.

Fig. 3 gives another view of the die stand and shows the steel clad front opening die ring, exposing the interior mechanism of the cam ring and die ring, and also how the improvement in the way of a front opening die

ring facilitates withdrawing and inserting chasers. In this design, the head can be kept clean and free from chips and grit that might work their way into the die head. When the front of the head is closed the operator can insert or withdraw the chasers from the inside of the head, so that he is not compelled to open the head to make these changes. The bottom of the slots of this die head, in which the chasers travel, are reinforced with hardened steel plates, which keep the lead of the chasers true and insure perfect threads. The cam ring construction is of the interchangeable type. The cams are not made a part of the ring, but are of steel, each cam being separate and inserted into the ring, making replacement possible if necessary at a nominal cost and avoiding the loss of the use of the machine for the want of a cam

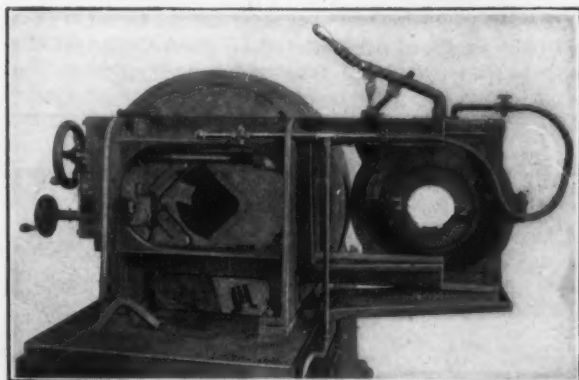


Fig. 4.—A Rear View of the Die Head, Showing the Cutting-Off Tool, Reaming Tool and Steady Slides.

that has become worn or broken. The chasers are of the interchangeable type—that is, each size is not only interchangeable in the same head, but any one chaser in a set can be replaced without reference to the balance of the chasers. This is an exclusive feature and does not necessitate the return of the entire set to the factory should one of the chasers become broken. These chasers are made in one piece, of special steel, and are especially adapted to the threading of steel pipe, whether hard or soft. There is no difference between the chasers for the top or the bottom of die ring; they are all the same and are numbered to correspond to the slots in the die ring.

Fig. 4 gives a rear view of the die stand and head, showing the arrangement of the cutting off tool, reaming tool and steady slides. The steady slides are interchangeable and easily replaced when necessary, doing away with the old time fork construction which required renewals from the factory and often delayed the operation of the machine. The method of delivering the oil to the dies and cutting off tool through the steel flexible tubing is also shown. Fig. 4 shows also how the die head clears the front chuck during cutting off operations and how close the die stand and cutting off tool can be drawn up to the front chuck.

The Stoeber Foundry & Mfg. Company's principal sales office is at 140 Cedar street, New York City. The company manufactures a complete line of machines, both of standard type and automatic, in sizes from $\frac{1}{4}$ to 12 in.

Boiler Feed Water Purification.—The purification of boiler feed water is the subject of two charts, reprinted from well-known authorities upon this subject by the Harrison Safety Boiler Works, North Philadelphia Station, Philadelphia, Pa. The charts show that the purification of water for boiler feeding purposes can be accomplished in a commercially successful manner by the proper application of heat and soda ash; that is, that these two remedies will entirely protect the boilers from corrosion and from the formation of hard scale. Since boiler feed water should be heated in any case, and since heating water by spraying through steam takes the place of the caustic lime or caustic soda used in other processes for taking up carbon dioxide, this hot process system is claimed to be the rational method of converting cold, hard water into hot, soft water for boiler feed purposes. The hot process apparatus designed and built by

this company combines all the functions of an open feed water heater with those of a softening system, and the fact that a feed water heater should be installed in any case thus makes it comparatively inexpensive to secure softening in addition.

The Seaboard Shipbuilding Trade.

Unusual activity in the seaboard shipbuilding trade has attracted the attention of the makers of steel plates and manufacturers of power machinery and other mechanical equipment. Within the last month a number of large shipping interests have asked the shipbuilders for bids on vessels, and according to H. L. Aldrich, publisher of *International Marine Engineering*, some large shipbuilding contracts are to be looked for in the near future. The seaboard shipbuilding trade is even now busier than it has been at any time for the last two years.

During the latter part of 1907 and the year 1908 announcements of contracts placed for coasting vessels and tramp steamers of a small tonnage were considered events in the shipbuilding industry, and the large Atlantic seaboard shipbuilders were taking contracts for dredges and car floats that they would not in ordinary times consider. Since January 1, according to figures gathered by Mr. Aldrich, orders to the value of over \$4,000,000 have been placed with four shipbuilders on the Atlantic coast for merchant marine vessels, in addition to many orders for river boats, tugs and other floating equipment. On the Pacific Coast new orders now in hand approximate \$3,000,000, and since the first of the year about \$4,000,000 worth of new vessels was ordered on the Great Lakes. Of this business it is stated that about \$3,000,000 worth of coastwise steamships has been ordered since May 1, and bids are now being asked on steamships to the value of about \$5,000,000.

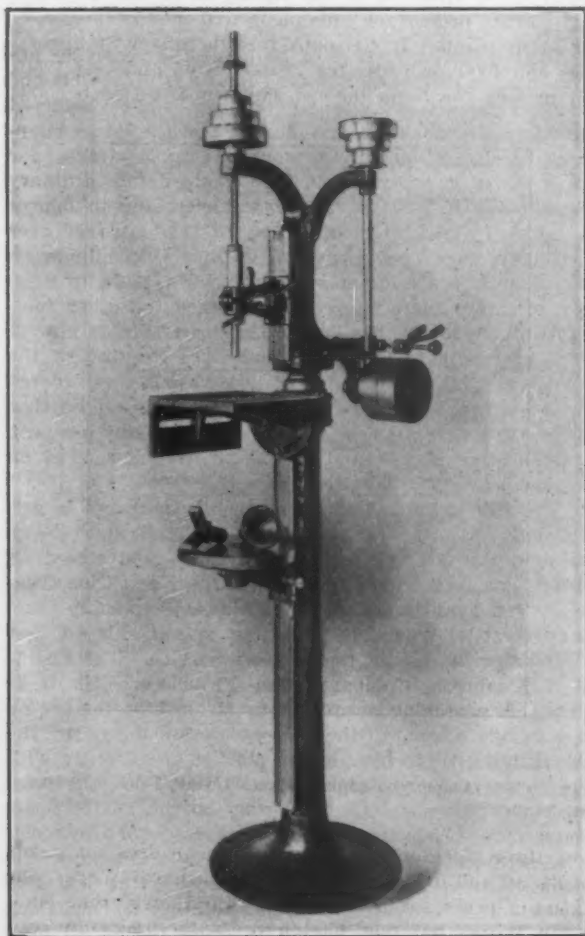
The American-Hawaiian Steamship Company is getting bids on four large steamships. The Newport News Shipbuilding & Dry Dock Company has just closed an order for a large vessel for the Mattson Navigation Company, San Francisco, Cal. The Alaska Steamship Company, Seattle, Wash., is preparing to ask bids on four steamships for use in the Alaskan service. The Pacific Mail Steamship Company, San Francisco, Cal., it is stated, is preparing to order four steamships for use on the Pacific Coast. Other recent developments in the shipbuilding trade include the placing of an order with the Newport News Shipbuilding & Dry Dock Company for two 5000-ton vessels for service on the Pacific Coast and another order with the same company for two coastwise steamers for the Ocean Steamship Company, the latter contract having been made within the last two weeks. The Newport News Shipbuilding & Dry Dock Company has also just closed an order for an oil tank steamship of several thousand tons for use on the Pacific Coast, and the Chicago-South Haven Steamship Company, Chicago, is arranging to build another steel vessel of the same size as its City of Chicago. According to Mr. Aldrich, the railroads for the last three years have been building but little floating equipment, and business in sight includes a large number of tugs and floats from that source, while numerous small vessels for the coastwise trade are in contemplation.

The Production of Lead in 1908.—The smelter production of lead in the United States in 1908, as given by C. E. Siebenthal of the United States Geological Survey under date of May 24, was 408,523 tons of 2000 lb., against 442,015 tons in 1907 and 418,699 tons in 1906. The production of refined primary lead, which embraced all desilverized lead produced in this country and the pig lead recovered from Mississippi Valley lead ores, was 396,433 tons, against 414,189 tons in 1907 and 404,669 tons in 1906. The antimonial lead produced was 13,629 tons, and the recovered or secondary lead 18,283 tons. In 1908 the lead smelted from domestic ores was 310,762 tons and from foreign ores and foreign base bullion (almost wholly Mexican), 97,761 tons.

The Reed No. 30A Drill.

A single spindle 13-in. drill press of new design, having a sliding head and equipped with either a swinging or tilting table, known as No. 30A, is now being offered by the Francis Reed Company, Worcester, Mass. The drive is arranged so that the machine may be placed to face the main line shaft without requiring a quarter turn belt from the shaft. This allows the machine to be lined up with the company's regular style A drill press.

All of the bearings are large and long, especially the table bearings which are $3\frac{1}{2} \times 3\frac{1}{2}$ in., insuring strong and rigid support. Three styles of tables can be furnished, a plain round table, a plain swinging table or one that both tilts and swings. The tilting table may be set at an angle of 45 deg. either side of the center, and with the use of a slotted angle plate work can be held at any



A New 13-In. Single Spindle Drill Press Made by the Francis Reed Company, Worcester, Mass.

angle. The table is 12 x 12 in. and the angle plate 12 x 6 in. For centering long work this angle plate may be used to take a chuck instead of throwing the whole table around 90 deg. A cup and V center are furnished to fit the lower arm and are aligned with the spindle so as to drill centrally.

The drive of the machine is unique, since it requires only a straight open belt. The main drive is low enough so that there is little tendency to vibrate even with the highest speed if the belt is in smooth running condition. The driving shaft runs in a bushing, which is an extension of the frame, 5 in. long. The loose pulley runs on this bushing and has no connection with the driving shaft. The drive is through mitre gears, one of which is rawhide, to a vertical shaft, which runs on a step, so that the gears are kept from crowding together. Through the three-step cone pulleys on the top of the machine the changes of speed are obtained and no countershaft is required.

The machine is capable of handling a $\frac{1}{2}$ -in. drill and of running at extremely high speed, so that the fastest speed permissible with the drills may be used. The tight

and loose pulleys are $6\frac{1}{4}$ in. diameter by $2\frac{1}{2}$ in. face. The three steps of the cone pulleys are respectively $3\frac{1}{2}$, $5\frac{1}{4}$ and $6\frac{1}{4}$ in. diameter. The spindle has a No. 1 or 2 Morse taper socket and has a vertical movement of 5 in. The vertical adjustment of the head is 12 in. The maximum distance of the spindle from the upper table is 8 in. and from the lower table 40 in. The minimum distances of the spindle from the two tables are respectively 0 and 7 in. The vertical adjustment of the lower table is $32\frac{1}{4}$ in. The base of the machine is 20-in. diameter, the height of the machine 70 in. and it weighs 290 lb.

The New Cisco Hand Power Crane.

A new hand power crane which is claimed to be an innovation in its field is known by the trade name Cisco and built by the Cincinnati Iron & Steel Company, Cincinnati, Ohio. It is so constructed and adjusted that

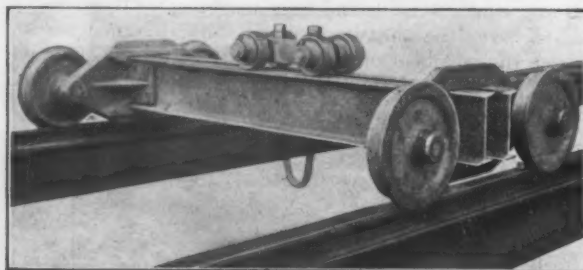


Fig. 1.—The Cisco Hand Power Crane Built by the Cincinnati Iron & Steel Company.

one man can easily work it with either hand. Fig. 1 shows the crane ready for use. It is composed of two end trucks such as the one shown in Fig. 2, which are roller bearing, and an overhead trolley suspended between these trucks on cross beams on which the trolley runs.

On the U-bolt of the trolley upon which is hung a chain hoist for the load, a collar is fastened by set screws just beneath the trolley, to which is attached a wheel running on the inside of the cross beams. This

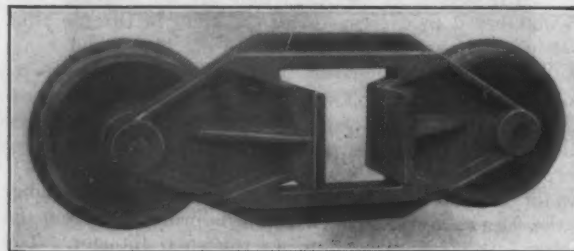


Fig. 2.—One of the Trucks of the Cisco Crane.

prevents the trolley from diverging or veering from a straight line. The cross beams overhang on both sides, so that in case of any overload beyond the capacity of the crane causing a break of any part, these beams will fall upon the I-beams on which the crane runs, decreasing likelihood of a serious accident. Through the provisions made for assembling the parts of this crane the necessary I-beams can be prepared by the user at his own shop, the end trucks and trolley being the only parts which it is ordinarily necessary to purchase from the builder.

A meeting of the mechanical section of the Engineers' Society of Western Pennsylvania was held in the Fulton Building, Pittsburgh, on the evening of June 1. G. W. Smith, vice-president of the Union Steel Casting Company, discussed "Foundry Methods"; John Allison, engineer with the Pittsburgh Steel Foundry, spoke on "Points to Be Observed in Design," and A. Stickl, consulting engineer, gave a talk on the subject of "Some of the Troublesome Features." A number of engineers connected with various steel foundries in the Pittsburgh District were present and took part in the discussion.

Exit Doors for Traveling Cranes.

To enable a traveling crane to pass from within a building out upon runways in the yard, F. Felkel & Sons Construction Company, 413 Fourth avenue, Pittsburgh, Pa., has patented an arrangement of sliding and lifting doors. Some of the buildings of the Inland Steel Company at Indiana Harbor, Ind., have been equipped with these doors. Two doors with a span of 57 ft. between rail centers have been installed in the engine house and are 8 ft. 6 in. at the highest point and 4 ft. 6 in. at the lowest. In Fig. 1 the lifting door is shown partly open and in Fig. 2 the doors are closed.

The doors are built to fit closely over the crane runways which extend without interruption from the shop interior to the desired point in the yard, and when opened readily permit the passage of the crane and cage. The doors are substantially constructed of light steel angles and bars, and are designed to insure stiffness and the maintenance of perfect shape, thus preventing springing and allowing a smooth and easy movement. Wire cables running over the sheaves and specially designed tracks furnish the means of operation, and the power is supplied by a small motor, although the doors may be worked by

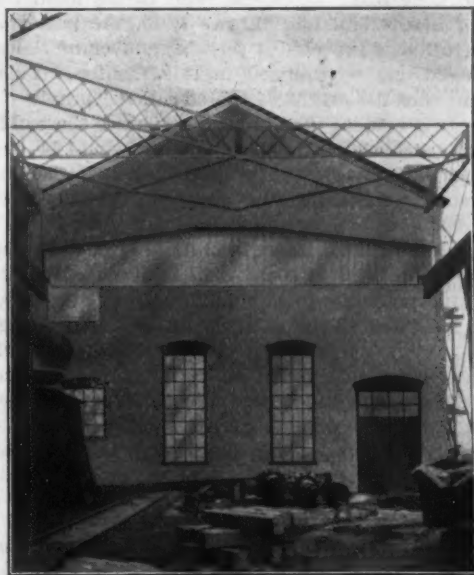


Fig. 1.—Doors Closed.

Lifting Doors to Permit Passage of Traveling Crane in the Inland Steel Company's Engine Plant, Installed by F. Felkel & Sons Company, Pittsburgh, Pa.

hand. The doors are covered with a translucent fiber known as rubber glass, which affords protection from the weather and yet gives light to the shop interior. The company builds the doors to suit special shop or yard conditions, but the usual arrangement consists of a lifting door for the exit of the crane and a sliding door for the passage of the load.

Car and Locomotive Orders Increasing.—Orders and order prospects for new cars and locomotives include the following, as reported by the *Railroad Age Gazette* in the past two weeks. The Denver & Rio Grande has ordered 1500 50-ton gondola cars; the Santa Fé, 500 automobile and furniture cars; the Chesapeake & Ohio, 1000 hopper cars; the Baltimore & Ohio, the rebuilding of 500 box cars; Missouri, Kansas & Texas, 800 freight cars; the Great Northern, 500 refrigerator cars; Minneapolis & St. Louis, 250 30-ton box cars; Iowa Central, 250 40-ton gondola cars; Maine Central, 100 gondolas. Among car business in the market the following is mentioned: Central of New Jersey, for 1500 freight cars; Louisville & Nashville, about to build 300 cars in its shops; Baltimore & Ohio, for 70 coaches; Lehigh Valley, for 15 coaches; Interborough Rapid Transit Company, for 150 subway and 100 elevated railroad cars; Pennsylvania Lines West, for 121 steel passenger cars; Charlotte Harbor & Northern, for 150 freight cars; St. Louis & San Francisco, for 60 coaches. Locomotive orders: Western

Pacific, 100; Chicago & Northwestern, 20; Northern Pacific, 10; Buffalo, Rochester & Pittsburgh, 15; Chesapeake & Ohio, 35. Roads in the market for locomotives: Harriman Lines, 145, including 45 Mallet compounds; Burlington, for 40.

The Development of the Harmet Process.

The practical value of the Harmet process for consolidating steel ingots by pressure while in the molds is demonstrated by the number of European steel works using it. In England Beardmore & Co., Ltd., have one 5000-ton press for ingots up to 34 tons, and two 3500-ton presses for 20-ton ingots; Cammell, Laird & Co., Ltd., one 2000-ton press for 9½-ton ingots and one of 5000 to 6000 tons for 40-ton ingots; Monkbridge Iron & Steel Company, one 1300-ton and one 2000-ton press for ingots of 5 and 8 tons, respectively; John Brown & Co., Ltd., one 6000-ton press for 40-ton ingots; Firth & Sons, Ltd., four 650-ton presses for 2-ton ingots and one 4500-ton press for 30-ton ingots. In Germany the Oberbiller Stahlwerk uses one 4000-ton press for 22-ton ingots and two 1250-ton presses for 5-ton ingots; Thyssen & Co., one 5000-



Fig. 2.—Doors Open.

ton, three 2500-ton and four 1250-ton presses for ingots of 34, 10 and 5 tons, respectively; Ehrhardt Works, one 1250-ton press for 5-ton ingots. In Austria the Poldihütte Works has one 450-ton press for 18-cwt. ingots. In Russia the Aciéries de Makievka has four 650-ton presses for 2-ton ingots, and the Société Métallurgique de Moscou a 500-ton press for ingots up to 24 cwt. In France the Chatillon-Commentry Works has four 850-ton presses for 2½-ton ingots and one 7000-ton press (on order) for 50-ton ingots; the Aciéries de Saint-Etienne, one 1800-ton press for 8-ton ingots, three 1130-ton presses for 4½-ton ingots, four 500-ton presses for 24-cwt. ingots, and one 5100-ton press for 32-ton ingots, with three 1250-ton and one 500-ton presses ordered.

The Perritt Iron & Roofing Company, Homewood, Pittsburgh, recently received an order from the Grand Trunk Pacific Railroad for approximately 500 tons of sheet steel grain spouting for a new concrete 5,000,000 bushel grain elevator to be erected at Ft. William, Ontario, Canada. The work totals about \$50,000. The Perritt Iron & Roofing Company has always made a practice of assembling the material on the ground where it was to be erected, and for this purpose has a full line of machinery, such as punches and shears, bending machines, cutters, &c., which it ships from point to point. The material for this job will go from Pittsburgh and will be assembled about December 1.

Machine Molding and Hand Molding.*

BY GEO. MUNTZ, WEST NEW BRIGHTON, N. Y.

It is surprising that in our century of improvements and automacity foundrymen call mostly anything a molding machine, and that machines performing only a fraction of the molder's work are known under that name. To the mind of a novice the definition of a molding machine would be a machine making just as good a mold as a molder does. We have passed from the plain squeezer, performing only the ramming of the sand, to the most complicated automatic machines, which take a flask from a laborer's hand and return a mold. The molding machine then really exists; it has taken the place of the molder in certain cases, but not in all cases, because it lacks adaptability. If we take a bench molder, able to handle a range of flasks from 10 x 12 to 16 x 20 in., he will be able to mold anything that can be put in those flasks, no matter how flat or deep the castings may be. That is what we call the adaptability of the molder.

The present automatic molding machines do the work, but only such work as they have been designed for. The fields seems then to be a small one, as for each class of work a special class of machine is required. I believe that an adaptable machine, just as adaptable as the molder is, can be built, provided the proper principles are observed. To make a mold, a machine has to be given all that is given to the molder—i. e., a pattern, a flask and sand, and then it must be provided with mechanical contrivances which will enable it to ram the sand, turn the mold over and draw the pattern. That is all that the molder does while molding. The patching up of the mold seems to be the only part requiring great skill from the molder, and this could be done away with if the patterns were perfect and if the molder were drawing them perfectly vertical when taking them out of the sand. It is there that the molding machine shows its superiority over the man, because if the molding machine is built to draw the pattern vertically, it will do so and do it all the time.

The Question of Ramming.

The main drawback to a universal molding machine is the lack of a universal ramming device. As far as the ramming is concerned the molder is universal. He knows that if he molds stove plate castings he will have to ram the sand a certain way; if he molds hollow ware he will have to ram the sand another way. In some molds the sand has to be rammed differently during the progress of molding, and this the molder can do because he is the adaptable molding machine par excellence.

The ramming question has then been tackled in different ways. The first method was the result of a simple observation. The rammer of the molder, when it comes down on the sand, squeezes it upon a certain area; and it had been thought that if the rammer were increased so as to cover the entire flask and sufficient pressure applied the ramming could be done just as well. It was the origin of the squeezers.

Practice shows that the piston or squeezer plate does not act as the rammer does, and this on account of the physical condition of the sand. If sand were absolutely dry and free of clay—in one word, unfit for molding—it would pack perfectly even; but foundry sand needs a binder and needs moisture, and therefore becomes the poorest thing in the world to be compressed evenly over uneven surfaces. But practice shows also that while the ramming is uneven in the immediate neighborhood of the pattern, it becomes very uniform above a certain distance from the pattern.

This observation brought Ph. Bonvillain and E. Ronceray to build their disappearing pattern molding machine. This machine is a squeezer, but the sand which is packed evenly over the pattern is in turn used as a piston to compress the lower layers of sand. This is done by building between the pattern and the piston supporting it a prismoid following exactly the outline of the parting line of the pattern, and having about one-third of the pattern height. The whole slides through a strip-

ping plate and when only the portion of the pattern that is wanted appears above the stripping plate the ramming stops, while the pattern still goes down, drawing itself through the stripping plate. This method has been successfully applied and I have seen six 3-in. projectile shells, about 12 in. long, molded in a 14-in. round flask, leaving $\frac{3}{4}$ -in. sand walls, and the sand was perfectly packed. The only apparent drawback is the cost of the pattern plates and the enormous size of the machine required for a comparatively small flask.

Another French inventor recently had the idea of using compressed air, but without any piston. The flasks he uses are special and when filled with sand are covered with a chamber the bottom of which is a rubber sheet. Compressed air is then admitted, and the rubber sheet acts as a piston and squeezes the sand evenly. Of course the surface of sand left by the rubber sheet is far from being a plane and requires some striking off for each mold. At some time in the near future I expect to show the possibilities of this machine.

Gravity and Jarring Machines.

The molder had been studied in one of his ways when the squeezers were designed, but he has other ways of ramming. For instance, in ornamental molding and in deep work he often takes the sand in his hand in the shape of a soft ball and throws it on the pattern. If this operation is repeated a certain number of times the whole mold can be rammed in this fashion. This observation was the origin of the so-called "gravity" machines. It is evident that in such machines the mold has to be guided by hand or else the sand would be packed harder in some places than in others, and this introduces the personal equation of the man, which is the greatest antagonist to automaticity.

There is another method, used more by the core maker than by the molder. It consists in taking a core box full of sand and pounding it on a table until the required degree of hardness of the sand is attained. This method has been very successfully applied in the "jarring" machines, and molds are made by it that are perfect in every respect. The only inconvenience I ever experienced with such machines was that the sand would not pack hard enough on top of the mold; but this was easily remedied by casting heavy plates of the size of the flasks used and placing them on top of the molds while ramming.

Of course the jarring machine requires heavier foundations than any of the other molding machines, but such foundations are made every day for steam hammers and I fail to see why the same sacrifices should not be made in the foundry.

Molding Machines and Machine Tools.

It always seemed to me that molding machines were considered like stepsisters to machine tools, and that every effort was made to keep them from attaining the same degree of perfection as the modern lathes and milling machines. To do away with skilled labor very intricate machine tools have been built, and if you are standing in front of one of these productions of human genius you will notice that every operation of the machine has been designed to replace some motion of a skilled hand. It is in this manner that a screw machine is fed with a roll of wire, and turns out thousands of perfect screws under the mere supervision of a boy or an unskilled laborer.

When the molding machine salesman interviews the purchasing agent of a foundry he is always received by the latter with a desire for a very simple machine, which will do in the hands of an unskilled man the work of a skilled molder. Molding machine manufacturers have, then, only been able thus far to produce fractions of the machines which would do in the foundry what the automatic lathe and the copying milling machine do in the machine shop. A molding machine to be as universal in the foundry as the automatic lathe is universal in the machine shop has to be just as complicated, and, what is more, has to be built so as to meet the exacting condition created by the presence of dust and soot, without which a foundry would not be a foundry.

In going over the various ways of ramming the sand

* Read at the Cincinnati convention (May, 1909) of the American Foundrymen's Association.

on a molding machine I stated that the jarring method was the most suited for the purpose, and the future will tell whether this is correct or not. The rolling over of the molds, the drawing of the patterns and the motive power of the machine are the only problems left to be considered. These have been worked out in innumerable ways, for they call only for the most usual mechanical contrivances.

I believe that to be successful a universal molding machine should produce in one operation the cope and drag of the mold, for in doing so an appreciable amount of handling is saved and a considerable number of mistakes avoided. This, of course, is not a rule, because when it comes, for instances, to molds of 6 x 9 ft., the machines would be so monstrous in size that they would be impractical. There is another case where it would be better to produce only one part of the mold at a time, and that is when a reversible pattern plate is used; the cope and drag of the mold are then identical, and only one pattern plate is required for making a complete mold.

Drawing the Pattern.

To draw the pattern mechanically, we had better observe first how the molder does it. When the mold is rammed up, and the pattern is not a split pattern, the cope has to be removed very carefully so as to avoid breakage of the sand. In removing the cope the molder has to do a certain amount of guess work, as he never knows the extent of the damage until the cope has been rolled over and placed alongside of the drag.

To remove the pattern from the drag is very easy, because the molder sees what he is doing and if he raises the pattern a little too much on one side the sand breaks and tells him that he has to incline a little more on the other side. It is then no wonder that the drag part has always been the molder's pet part of the mold, and that he is never so pleased as when he gets a split pattern where he can remove the two halves from the cope and drag in the same fashion. Moreover, when the pattern is drawn in this manner the sand might break, but there are 75 chances out of 100 that it will approximately take its place after the pattern is removed and then will only have to be secured in the right place.

This is the method we will have to follow in drawing the pattern by machinery, because every pattern can then be considered as a split pattern. It means, of course, an unnecessary rolling over of the cope, but this is such a trifling inconvenience that it is not worth while to stop at it.

Motive Power.

As far as the motive power is concerned, there are two kinds of power which the foundryman has always handy; namely, hand power and the power he derives from the motor driving his blower. The first has been catered to a great deal and is, I think, quite primitive. It always reminds me of the days of the foot driven lathe when I see one of the hand squeezers where the pressure could so easily be applied by power, and where a man has to hang with all his might to a lever while making a hundred consecutive molds, and then has to pour off and shake out. Compressed air and water under pressure are now used, but they mean greater initial expense and are some of the reasons why foundrymen do not use molding machines to a greater extent. Then why not cater to that other power which the foundryman has always handy? It takes very little to drive a molding machine. Then why not make it belt driven, or why not make it self-contained and have its own motor? While the efficiency of compressed air is disastrous, the hydraulic power is most efficient, and I was once a convert to it, but I soon found out that water does not agree very well with sand and metal patterns. Leaks are frequent wherever piping is to be used, and while they mean only waste of power with compressed air, they mean waste and trouble with hydraulic machinery. No wonder, then, that I prefer the belt and pulley drive, or better an electric motor in a dustproof case, directly geared to the machine.

The Coming Molding Machine.

In conclusion, the molding machine of the future will be just as automatic as the improved machine tools of

the machine shop. It will be belt driven or be self-contained and have its own electric motor. It will unquestionably have a universal ramming device based on the jarring method of ramming, an automatic clamping device which will allow the molds to be rolled over without any fear of the flasks coming apart from the pattern plates, and an automatic and adjustable pattern drawing arrangement. And here is where we hear the foundrymen say that it will take mechanics to run such machines. It will not any more than it takes mechanics to run automatic screw machines.

In every machine shop there is a tool maker who has the supervision of all the machines and equips them with the tools without which they would not be automatic. In the modern foundry there will also be a kind of a tool maker, but this man will have to be even more universal than his brother of the machine shop, for besides being a machinist he will have to be a molder. He will make the pattern plates and look to the fulfillment of good working conditions of the machines.

Foundrymen now have everything necessary for a solution of the problem. They know that molding machines will never take the place of the good all around molder, but will be a great help to him in the tedious task of duplicate work. They know also that the foundry in any big concern is always the largest dividend payer, although the methods employed to come to this result are the same as our grandfathers used on a smaller scale. It is then time to modernize and come, in the foundry, to the same pitch of improvement as we have come to in the machine shops. We have good examples; we only need to follow them.

Steel Corporation Employees' Stock.

A table has been prepared showing the amount of stock subscribed for by the employees of the United States Steel Corporation at the different offerings in recent years. The presumption on which the statement is prepared is that the employees have a possible profit of the difference between the total purchase price and the present market value of the shares. It is to be considered, however, that very considerable sales of these stocks have been made from time to time in the past six years. The table shows the amount of stock subscribed for by employees each year since the profit sharing plan became operative, the price paid and the cost:

Years.	Preferred stock.	Shares of preferred taken.	Total cost.
1909.....	\$110.00	18,000	\$1,980,000
1908.....	87.50	25,000	2,187,500
1907.....	102.00	27,032	2,757,264
1906.....	100.00	23,989	2,398,900
1905.....	87.50	17,973	1,572,638
1904.....	55.00	32,516	1,788,380
1903.....	82.50	48,983	4,041,098
Totals.....	\$89.2	193,493	\$16,725,780
<i>Common Stock.</i>			
1909.....	\$50.00	15,318	\$765,900
Total cost to employees.....			\$17,491,680
Present market value.....			24,138,240

* Average.

It thus appears that the preferred stock sold by the Steel Corporation to employees averages \$86.44 a share.

The Society of Naval Architects and Marine Engineers, whose headquarters are at 29 West Thirty-ninth street, New York, will hold its summer convention June 24 to 26 at Detroit, Mich. The registration office will be in the Hotel Pontchartrain, and the professional sessions will be held in the rooms of the Employers' Association, Stevens Building, corner of Griswold and Washington streets. Arrangements have been made for visits to points of interest in the vicinity. Francis T. Bowles, Quincy, Mass., is president of the society, and William J. Baxter, U. S. Navy Yard, Brooklyn, N. Y., is secretary and treasurer. The local and reception committee at Detroit consists of William Livingstone, M. E. Farr, H. D. Goulder, Frank Jeffrey, Richard P. Joy, Frank E. Kirby, Robert Logan, Henry Penton, Antonio C. Pessano and Herbert C. Sadler.

Pulverized Coal for Foundry Purposes.*

BY RICHARD K. MEADE, NAZARETH, PA.

The use of pulverized coal in place of producer gas and oil for heating furnaces of all classes has grown very largely in the last 10 years. At present it is safe to say that approximately 2,500,000 tons of coal are burned annually in the pulverized condition. This form of fuel is used almost exclusively for the heating of rotary cement kilns and furnaces for the nodulizing of fine iron ores, the only exceptions being in localities where natural gas is available or where fuel oil is cheaper than coal. Powdered coal has also been used in furnaces for malleable castings and for annealing.

The subject is one which has not received the attention from metallurgists and foundrymen which it deserves. The use of pulverized coal offers many advantages over gas heating, not the least of which is the economy. Where coal is converted into gas there is always a certain loss due to the complete combustion of a part of it to carbon dioxide and also to the fact that some heat is lost by radiation and some coal is carried away unburned by the ash. It has been estimated that the losses of the producer are seldom less than 20 per cent. and generally average about 30 per cent. of the thermal value of the coal. Where pulverized coal is burned, on the other hand, the coal is injected into the furnace and is entirely burned there in direct communication with the charge. The entire number of heat units in the coal is liberated in the furnace and consequently the whole amount of heat is produced where actually needed.

IA Reducing Flame Secured.

Another advantage which is to be met with in the burning of pulverized coal is in the fact that it may be burned with almost the exact theoretical quantity of air necessary for complete combustion. Frequent analyses made upon furnaces fired with pulverized coal show that the excess air can be easily reduced to 20 per cent. of the theoretical quantity without having more than 0.1 or 0.2 per cent. carbon monoxide in the waste gas. If a reducing flame is desired it is easily possible, by diminishing the quantity of air admitted, to produce a flame of the latter quality.

Coal dust heating is particularly well adapted to obtain high temperatures in open hearths and furnaces of this character. It is possible by using powdered coal to obtain a very much higher temperature than by the use of producer gas. For instance, with ordinary good gas slack it is easily possible to obtain a temperature of between 1800 and 2000 degrees C., while with producer gas without regeneration it is seldom possible to obtain a temperature with 300 or 400 degrees of this.

It is also possible with powdered coal to obtain just as long a flame as can be obtained with producer gas. By varying the draft, and consequently the amount of air brought in with the coal, and the fineness of the latter, it is easy to draw the flame entirely through the furnace into the stack. We have even seen the brick of the stack slagged where the flame had been allowed to go the full length of the furnace. It is also possible to concentrate the flame within a very short zone. In a rotary cement kiln 60 ft. long, by the use of a damper consisting of a door at the foot of the kiln stack, it is possible to obtain a flame which will reach either the entire length of the kiln or else be concentrated in the first 20 ft.

With pulverized coal it is possible to obtain a very regular heat, much more regular than can possibly be done with producer gas. The latter is very irregular in its composition, even where the producers are very carefully handled, while with the coal the composition is usually very constant. If the coal is fed to the furnace at a uniform rate and the air admitted to the latter through an opening of definite area, the temperature will remain practically constant other conditions remaining so.

Low Grade Coals May Be Used.

Another advantage which is met with in pulverized coal firing is in the use of low grade fuels. Many coals

may be burned in this manner, which would slag so badly if burned on a grate that the producers or furnace would have to be entirely shut down to remove the clinkers. The table below gives some analyses of coals which have been burned in the powdered form. As will be seen, most of them are high in volatile matter, and these are best for pulverized firing. It is possible, however, to burn coals very much lower in volatile matter than those given in any of the above analyses by pulverizing the coal very finely.

Analyses of Coals Used for Burning in Powdered Form.

	Moisture.	Volatile combustible matter.	Fixed carbon.	Ash.
Wellston, Ohio.....	2.94	41.96	42.82	12.27
Fairmont, W. Va.....	1.38	35.04	56.03	6.27
Connellsville, Pa.....	2.15	34.20	57.49	6.16
Illinois	7.50	30.70	53.80	8.00
Alabama	0.82	33.76	61.57	3.85
Hocking Valley.....	6.59	34.97	48.85	8.00
Poor quality, Penna....	2.10	29.63	51.28	16.99
Poor quality, Penna....	2.32	27.08	47.34	23.26

Another saving which is effected by the use of pulverized coal is in doing away with the very tall stacks used in order to provide draft sufficient to draw the air through the fuel bed. This draft is always more or less an uncertain quantity, owing to the fact that it varies considerably with the nature of the coal used. With pulverized fuel all that is needed is sufficient draft to carry off the products of combustion.

The three questions oftenest asked in connection with pulverized fuel are: What becomes of the ash? What is the danger of explosion? What is the cost of the process, both for installation and operating expenses?

A Question Concerning Ash.

With respect to the first question, it may be said that the ash of pulverized coal is very light and that a great deal of it is carried off by the strong draft which exists in most metallurgical furnaces. There need never be any apprehension, however, that sufficient of the ash will settle on the charge to insulate it and prevent its heating. Where regenerative furnaces are used, however, to heat the air for combustion, the ash, of course, may collect in the checker work. Where pulverized fuel is used for burning, therefore, the regenerators should be designed with large ash settling chambers and wide passages in the checker work. The latter should be also so fixed that they may be cleaned out with a jet of compressed air. As we have said, it is possible to obtain much higher temperatures with pulverized coal than with producer gas. It is probable that in many instances the regenerative furnaces could be left out altogether and that pulverized coal would still show as good economy as producer gas. The amount of heat introduced by preheating the air necessary (10 lb.) for the combustion of 1 lb. of coal is never more than 4000 B.t.u., which just about balances the loss in the producers in gasifying 1 lb. of coal.

It happens that if the flame is projected directly against the wall of the furnace the ash will slag the latter and very soon eat it away. The best plan, therefore, in heating these furnaces is always to direct the flame so that it strikes against either the charge or else the slag upon this. In all furnaces in which the metal is protected by a slag above no apprehension need be feared as to the ash, as by directing the flame against the slag the ash will fall into this and be taken care of.

In coal dust firing the best results are obtained by injecting the material against a hot surface such as a molten charge or the hot walls of the furnace. In starting a recently charged furnace where the walls of the latter are incandescent, it will therefore usually be necessary to direct the flame for a few minutes against the hot sides of the furnace until the coal dust ignites. It can then be turned down upon the charge.

Explosions.

With respect to the second question, the danger of explosion. This has been very largely magnified. Pulverized coal in a pile burns very slowly and with absolutely no explosive effects. It is only where the coal is stirred up and suspended in the air that explosions occur. They also occur very much more frequently in badly ventilated buildings. To guard against explosions the building in

* A paper read at the Cincinnati meeting (May, 1909) of the American Foundrymen's Association.

which the coal is pulverized should be provided with ventilators in the roof to carry off any gas which accumulates. Electric lights should be used throughout the building, and no workman's torches should be allowed in it at any time, whether the mill is running or not. With a little precaution firing with powdered coal may be considered as safe as firing either with producer gas or oil.

Operating and Installation Costs.

As to the cost of preparing the coal, a great many improvements have been made of late in grinding machinery, and materials of all classes may now be pulverized at a much lower cost than formerly. Where small quantities of coal only are needed, any of the wind pulverizers upon the market will give fairly satisfactory results. Where quantities of coal approximating 40 or 50 tons per day are to be burned it will always be found more economical to install a good fuel plant. Such a plant would consist of a rotary cylindrical dryer, through which the coal is passed to free it from moisture. The dryer is followed by either a pot crusher or a set of rolls which are designed to reduce the coal to a size of $\frac{1}{2}$ in. and under. The pot crusher may be followed by a Fuller-Lehigh mill. This mill is very economical of power and has a large output compared with the energy necessary to run it. These mills are practically dustless, take up small floor space, and are hence well suited to coal pulverizing. A mill of this type will grind from 150 to 200 lb. of coal per horsepower hour, bringing the coal to a fineness of 92 per cent, passing the No. 100 mesh sieve.

The cost of a plant for preparing 100 tons of coal per day will be approximately \$17,000. A plant for the production of one-half this quantity would cost about \$10,000. As to the cost of preparing the coal itself, a plant preparing 100 tons of pulverized coal per day would cost about \$30 a day for running expenses, labor, power, coal for drying, repairs, fixed charges, &c., which would make the cost of preparing the coal 30 cents per ton. This is a liberal figure.

Method of Burning the Coal.

As to the method of burning the coal, this is usually done by means of a form of injector together with a fan. The coal itself is usually brought from the fuel mill by means of a screw conveyor and stored in a large bin near the furnace. It is drawn from this by means of a screw conveyor. This conveyor is actuated by some form of speed controller, and the amount of coal fed to the furnace may be regulated very closely by the speed at which this screw conveyor is run. The coal from the conveyor drops down in front of a blast of air from a fan and is carried off by this into the furnace. Only about 20 per cent. of the air necessary for combustion is burned with the coal.

A great many foundries and metallurgical works have installed apparatus for burning pulverized coal. In most cases they have had more trouble with the process used for pulverizing than with the actual use of the coal itself. This has in almost every case been due to the fact that the machinery which they installed was of a cheap and inefficient form, usually of the hammer and wind type. By the employment of good machinery, properly installed, the pulverizing part of the proposition becomes a very simple one.

As to the actual results obtained in foundries, it is almost an impossibility to get reliable figures. Even from several plants, with the installation of whose grinding machinery the author of this paper has been intimately connected, it has been very hard for him to obtain any information. The conclusions drawn above, however, have been verified by the results obtained by one large foundry using powdered coal for the firing of its heating furnaces.

In conclusion, it may be said that the subject is one of such splendid possibilities that it is strange that metallurgical engineers have not given the subject very much more attention. In the cement industry fuel oil was first used. As the expense of this increased it was necessary to find a cheaper fuel. Producer gas and pulverized coal were both tried. With the former it was found impossible to obtain the proper temperature without the employment of some form of regenerating oven. With pul-

verized coal, on the other hand, no difficulty was met in obtaining temperatures very much higher than those needed in the cement kilns; namely, about 3000 degrees C. Now practically all the Portland cement burned in this country is burned in rotary kilns. They have been used for heating metallurgical furnaces at a number of plants, and it would seem that the up to date foundry could employ pulverized coal to great advantage.

Steel Production in Great Britain in 1908.

The British Iron Trade Association's statistics show that the production of steel ingots in the United Kingdom in 1908 was 5,340,642 gross tons, as compared with 6,522,748 tons in 1907 and 6,462,274 tons in 1906.

The production of Bessemer steel ingots was 1,478,539 tons. In the following table the distribution between the acid and basic processes is shown for 1908 and the two preceding years:

British Bessemer Steel Production.—Gross Tons.

	Acid.	Basic.	Total.
1908.....	906,466	472,073	1,478,539
1907.....	1,280,315	578,944	1,859,259
1906.....	1,307,149	600,189	1,907,338

The production of Bessemer and steel rails (including ties and fishplates) in the United Kingdom in 1908 was 715,407 tons, as compared with 832,576 tons in 1907, a decline of 117,169 tons. Not since 1895, when 601,338 tons was produced, had rail, tie and fishplate production been at such a low figure.

The production of open hearth steel in Great Britain in 1908 and the two preceding years, as divided between the acid and basic open hearth, was as follows:

British Open Hearth Steel Production.—Gross Tons.

	1908.	1907.	1906.
Basic steel ingots.....	1,238,263	1,278,709	1,176,245
Acid steel ingots.....	2,578,840	3,384,780	3,378,691
Totals.....	3,817,103	4,663,489	4,554,936

It will be seen that while the acid open hearth steel output fell off about 25 per cent. from that of 1907 the production of basic steel was only about 3 per cent. less last year than in 1907. The production of open hearth blooms and billets and of rails was as follows in the three years:

	1908. Tons.	1907. Tons.	1906. Tons.
Blooms and billets.....	999,636	498,656	580,961
Rails	192,525	79,532	94,926

No statistics of the production of steel castings or of crucible steel are collected in Great Britain. It will be noticed that while the steel ingot production in 1908 is given as 5,340,642 tons, the total of the Bessemer and open hearth tables is 5,295,642 tons, the difference being 45,000 tons. For 1907 and 1906, on the other hand, the total steel ingot production, as given above, is simply the total of the Bessemer and open hearth steel production.

In contrast with the falling off in steel production in 1908 the statistics show an increase in the output of puddled bar iron in the United Kingdom. It was 1,168,115 tons, against 975,083 tons in 1907 and 1,010,346 tons in 1906.

Filling Blow Holes and Repairing Cracks in Castings.—The filling of cracks and holes in castings and similar work is often very important, and almost every foundry and machine shop has to do it at some time or other. The S. Obermayer Company, Cincinnati, Chicago and Pittsburgh, has placed on the market the National iron filler cement for this purpose. It is put up in 12-lb. cans in the form of a powder, which has simply to be mixed with water in the consistency of a stiff putty and applied to the crack or other defect. After a few hours this cement hardens, or rather metallizes, and becomes a part of the iron itself. The defect so repaired can scarcely be noticed, while the material permits of machining, as it has virtually become a part of the casting.

The Kittanning Iron & Steel Mfg. Company blew out its Rebecca Furnace at Kittanning, Pa., May 25, having a good deal of iron piled up, and will make some needed repairs.

THE IRON AGE

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	-	-	-	-	-	HARDWARE EDITOR.

Recasting the Lines of Employment.

The extent to which the working forces of many manufacturing companies have been broken in upon by the panic of October, 1907, and the hard experiences of succeeding months is a factor that already has begun to assume some importance. The operation of many plants was carried on under reduced hours for months following the panic, the effort being to give employment to as many men as possible and to hold forces together in anticipation of the resumption at approximately full time, which it was widely believed could not be long delayed. In many other cases, however, large reductions in working forces were necessary, and the men so thrown out found at length that there was no probability of their being restored to their positions for months. Naturally these sought employment at work in lines less affected by depression. Often this took them many miles away from the scene of their employment in the period of prosperity.

It need not be said that many of these men were misled by newspaper reports of an industrial revival, which was chiefly a revival on paper. The Pittsburgh District, by reason of constant reports of resumptions, which were only resumptions for brief runs after intervals of idleness, attracted large numbers of men from other sections. Citizens of Pittsburgh whose business brings them in contact with stranded travelers—the officers of the law and the officers of relief organizations—know that large numbers of those who came in upon them from other cities last year were in worse plight when they left than when they entered that city. In general the West, of which it was constantly said that it had suffered far less from the falling off in business than the East, had the greatest problem to deal with from the influx of the unemployed.

The outcome of the uneven conditions in different industries in the 18 months of slack time has been an interchange of workers among the sections, with results that are difficult of exact measurement. One thing to which employers in metal working lines very generally refer in discussing the subject is the absorption of many of their skilled men by automobile manufacture and all the industries contributing to it. Perhaps the commonest comment upon the anomalies of business in this last period of depression is that the automobile trade expanded instead of being affected soonest and the most unfavorably. All the businesses which the automobile has benefited have been drawing men from others, in which the hard times have been most felt. As is well known, these new employments are paying better in

most cases than those left behind, and the return of such workers to their old positions is not to be expected.

It is quite early to speak of the demand for men anywhere exceeding the supply, but it is a fact that in particular cases the loss of an effective organization is already being brought home to managers of plants whose operations have been expanding in the past two months.

Another phenomenon is attending the recent industrial expansion. It was often commented on last year by those in charge of work ordinarily giving employment to common labor, that skilled workmen applied in large numbers for these jobs, which paid perhaps half what they had previously been able to earn. Such men were available for forms of outdoor work which they had never before performed. A sure indication of the enlarged scale of shop operations in recent weeks is the steady elimination of skilled workmen as competitors with common laborers.

As 1909 is to be considerably less than an average year of railroad building the supply of foreign laborers for such work promises to be ample, in view of the return of thousands of immigrants to this country in April and May, after a year's stay abroad. Moreover, public work, particularly in the laying of water and gas lines, is not yet on such a scale as to make an impression on the market for the commonest labor. Perhaps the best indication that some manufacturers are thinking of the coming need of a full and efficient organization of skilled men is the announcement of wage restorations, particularly in the iron industry. What is already evident is that the shiftings of the past 18 months have been so many that the readjustment to anything like a normal alignment of labor will be a matter of months.

A Phase of Tariff Statesmanship.

The Senate tariff debate at Washington has not been lacking in the sort of railing at business interests that is considered good form in a political campaign. There is no partisanship in this detraction, which seems to be the Congressional echo of much that was featured in magazines and reviews before and after the panic. It seems to be based on the idea, honestly entertained in some cases perhaps, that modern business is organized plunder. So many Senators appear to share this view that their differences often narrow down to the single point of the sphere of operations of the plunderer. An interesting example was the attempt to have the Finance Committee investigate retail prices in the United States for certain imported articles "to find out whether the retail dealers of the country are practicing extortion." The resolution did not prevail, but one Senator who urged it contended that "if the retail dealers are the robbers they are alleged to be they ought to be sought out and held up to wrath and execration."

The idea appears to be seriously entertained in some Congressional quarters that the foundations of all industry and trade are laid in tariff schedules. To make a tariff bill is thus taken to mean the analysis, with fine discrimination, of the yield of every form of business to determine whether a "reasonable profit" is being made. So many Congressional orators had branded the manufacturer as a grinder of the faces of the people that it occurred to others to bring a like railing accusation against the retailer. As the debate goes on it may be borne in upon the minds of other statesmen that the jobber is the chief malefactor. The main thing is the location of the "robber" and "holding him up to wrath and execration." That is the high statesmanship and the

royal road to the restoration of confidence and prosperity.

International Iron and Steel Trade in 1908.

Attention has already been called in these columns to the fact that Germany's exports of iron and steel in 1908 were greater than those of 1907. Germany is the only country making such a showing. In the case of Great Britain, which leads in the amount of iron and steel shipped to other countries, the falling off in 1908 was more than 20 per cent. from the record made in 1907. Referring to the standing of the three leading iron and steel countries in the matter of exports, the *London Iron and Coal Trades Review* notes with some satisfaction that Great Britain was far in the lead, notwithstanding Germany's gain. It presents the following comparison of exports in the two years, those for Great Britain and the United States being stated in gross tons and that for Germany in metric tons:

	1907. Tons.	1908. Tons.
United Kingdom.....	5,311,993	4,233,956
Germany.....	3,455,899	3,732,428
United States.....	1,301,979	964,266
Totals.....	10,069,871	8,930,650

It is to be noted that of the 280,000 tons increase in German iron and steel exports last year, 245,000 tons, or nearly 90 per cent., was in semifinished steel, most of which found its way into Great Britain and must be classed as dumped product. Much of it entered into sheets, which in turn were shipped by British mills into Germany or to other markets in competition with German export sheets.

We reproduce also the following table which shows the relative positions of the leading producing countries in respect to pig iron exports:

Pig Iron Exports from Leading Countries.

	1907. Tons.	1908. Tons.
United States.....	73,703	46,696
Germany.....	275,000	258,000
United Kingdom.....	1,942,335	1,259,767
France.....	257,000	178,873
Russia.....	73,000	9,400
Belgium.....	24,423	14,014
Totals.....	2,645,461	1,766,750

Here is a falling off of nearly 900,000 tons, or about one-third, from the total of 1907, four-fifths of the loss falling upon Great Britain. It is a question how far satisfaction may justly be taken in such a pre-eminence in pig iron exports as the British iron industry enjoys, particularly as Germany is the chief customer for British pig iron, while bounty-fed German furnaces are at times considerable exporters of pig iron to Great Britain. In 1907 Great Britain contributed 73.5 per cent. of the pig iron exports of the six countries named, and in 1908 approached this closely, with 71 per cent. When our Southern States were finishing but a negligible percentage of their pig iron production within their borders, they were characterized as "hewers of wood and drawers of water" for the rest of the country. Similarly the fact that Great Britain's pig iron exports were 36.5 per cent. of her total iron and steel exports in 1907 and 30 per cent. in 1908 is by no means the badge of pre-eminence that would be conferred by such a tonnage distributed among the various forms of finished product.

An interesting prognostication with regard to building conditions in the State of Iowa is set forth in a recent issue of the *Des Moines Register and Leader*. Attention is called to the fact that in the settlement of the State the demand for building material was so urgent that timber was freely used in unseasoned condition. The

houses were at first fairly comfortable, but they are now in such condition that winter blasts penetrate them freely. Being mere shells, they are also susceptible to the heat of summer. The consequence is that many thousands of these houses all over the State are in a condition almost unfit for habitation, but too good to pull down. It is pointed out that as cement is now so cheap, and so many forms of metal lath are also to be secured cheaply, the exteriors of these houses are likely to be stuccoed, the movement in this direction having begun. This is expected to open up a continually increasing market for sheet metal and other forms of metal lath. What is said with regard to dwellings in Iowa applies equally well to other Western States.

Influence in Securing Preferment.

The young man who enters a business house may be given his opportunity because of the influence of his friends, but he is no longer exempted from the serious labor incident to a proper training, as often used to be the case. His work is no sinecure. Usually it begins with the more menial of office duties, or as a workman in the shop or factory, starting at the bottom in order that he may eventually be well equipped for a position of responsibility which it may be intended that he shall ultimately fill. The complaint was formerly well founded that patronage played too important a part in industrial establishments; that the young man with influence, usually accompanying capital invested in the business by family or friends, was put rapidly ahead, beginning not too far from the top. It is rare that such a criticism is well founded to-day. Capital demands the greatest possible efficiency from those who direct its investments, and young men must "make good" in preliminary training and test before they are intrusted with important duties. Very often men who were unknown to the management when they began their connection with the establishment are pushed ahead of those who had been destined for executive offices, because they have acquired a superior equipment for the duties involved. In the survival and promotion of the fittest, moneyed or family interest does not count unless it is backed by ability coupled with practical training. There is a democratic relationship of men in American business houses, in that none is too humble to be advanced by his own efforts to the limit of his ability and industry.

Training in the works themselves is now keenly valued by employers. They insist that the young men who are intended for the higher positions shall come in contact with conditions as they exist in the plant outside of the office. A more intelligent knowledge of the business is acquired in this manner. The successful executive officer includes in his conception of the affairs over which he has control something more than the actual knowledge of manufacturing processes and costs and methods. There is a certain personal equation to the management of a plant. The young man of normal mind naturally gets to be on a friendly footing with those with whom he works. In later years, should he rise to the management, this acquaintance and friendship may stand him in good stead at critical times.

The Carpenter Steel Company, Reading, Pa., announces the opening of a branch office and warehouse at 189 Allyn street, Hartford, Conn., which will be under the management of George S. Cairnes.

CORRESPONDENCE.

Government Purchasing Methods.

To the Editor: The clumsiness and lack of proper business method organization in Governmental office systems have been commented upon ever since the republic was founded. Many of the criticisms were not made in good faith and many were due to a lack of knowledge of the essentials of safeguarding the details of the country's expenditures, but nevertheless many contentions were well grounded and have resulted in modification of office systems in the several departments and have simplified and accelerated the dispatch of business.

A case that seems to us to call for some special attention at this time is the manner of purchasing supplies by the Isthmian Canal Commission through its single purchasing officer. The gentleman in charge of this department is an especially well equipped executive and has a very general grasp of business affairs, but unfortunately he is overburdened with responsibilities. In his capacity he must purchase for the commission every kind of article it uses and must individually pass upon the details of every item, from a toothpick to an anchor. Manifestly this is imposing too much on one man, no matter how competent he may be, but the greatest fault lies in the delays that must inevitably come from such a system or rather the lack of an adequate one, and that is that bidders who submit propositions on commodities subject to fluctuations and sometimes violent price changes of raw materials have been held up for a number of months pending a decision as to awards.

Any manufacturer who undertakes to handle a large contract must protect himself in the matter of cost of raw material, but he cannot do so under the prevailing purchasing methods employed by the Isthmian Canal Commission. Those who suffer most by this faulty system are the manufacturer's engaged in the metal lines, as they cannot afford to protect themselves when the result of their bid is an indefinite uncertainty. It would seem to us that the purchase of supplies should be so systematized as to provide a different buyer for each general class of merchandise requirements, thus specializing the details, insuring prompt decisions in the matter of bids and giving those who aspire to secure the business a fairer chance than they have at present. BRONZE.

NEW YORK, May 27, 1909.

Continuous Systems in the Foundry.

To the Editor: Permit me to supplement my contribution to the discussion on continuous melting and mechanical handling in the foundry, as given in your report of the American Foundrymen's Association meeting at Cincinnati, in *The Iron Age* of May 27:

It appears to be demonstrated by the considerable number of successful systems in use that by means of mechanical handling in the foundry the efficiency of the workman is increased from 10 to 50 per cent. (this increase having been duly charged with what additional nonproductive labor is necessary), the average wage can often be reduced somewhat, the foundry loss is decreased, the floor space reduced sometimes by as much as one-half, this also taking account of necessary additional power plant, &c., and that by mechanical handling only can the full capacity of molding machinery be realized.

The increase in capacity available from molding machinery is considerable, even though only sand handling machinery may be employed, as in some classes of work sand handling machinery is the only form of continuous handling equipment possible—malleable work, for instance, in which the melting is done in the air furnace. Investment charges are not seriously increased when the saving in equipment due to increased efficiency is considered.

G. K. HOOPER.

NEW YORK, May 29, 1909.

Two more open hearth furnaces in the South Sharon Works of the Carnegie Steel Company have been started, making eight of the 12 furnaces in this plant in operation.

The Aluminum Industry.

The following comments on the condition of the aluminum industry are taken from an article appearing in a recent issue of the *London Times*:

The outlook for the industry is not very reassuring, and it is possible that there will be further failures and a general writing down of capital before the industry is permanently settled on the new basis of prices. It is, in fact, generally recognized that aluminum has fallen from levels of value which will never be touched again, and that though some slight recovery may occur from the present low price of £85 per ton, the metal will not again be sold at £150 or £200 per ton, or at anything like those figures. The lower level of prices will, therefore, tend to eliminate from the industry all works which operate under disadvantageous conditions, and to make only the more strongly financed and well situated undertakings survive the present period of stress.

The French companies have the strongest position in this respect, while the Aluminum Company of America, formerly known as the Pittsburgh Reduction Company, also is believed to have accumulated large reserves during the long period in which it has enjoyed a monopoly in that country. As regards the British Aluminum Company, the large expenditure upon the developments of water power which this company has taken in hand during the last three years has depleted its resources. No doubt this expenditure will ultimately prove remunerative, but it is quite possible that, like the Neuhausen Company, the British Company will have to turn to other manufactures than aluminum in order to earn profits on the large capital sunk in the Loch Leven undertaking.

Production and Price.

The figures for the output of aluminum in 1908 necessarily possesses more of the character of estimates than usual. None of the producing companies has published any official returns for the past year, and the very heavy reduction in price as compared with 1907 has had the effect of entirely stopping the operation of the three new works which were being erected by English companies, and also of curtailing the output at some of the older works.

It was recently stated that the Neuhausen Company (the oldest of the European companies) had decided to devote some of its available power to the more profitable manufacture of artificial nitrates from the air, and this policy, no doubt, will be followed by some of the other companies. In view of the unsettled state of the aluminum industry in 1908, it is unlikely that the anticipated great increase in production occurred, and the writer estimates the output for 1908 at not more than 25,000 tons. The figures for the last 12 years, with the average price per ton, are given in the following table:

Year.	Estimated production. Average		Year.	Estimated production. Average	
	Tons.	price.		Tons.	price.
1897.....	3,327	£155	1903.....	8,102	£120
1898.....	3,953		1904.....	8,550	
1899.....	5,459		1905.....	9,000	150
1900.....	7,192	148	1906.....	12,000	200
1901.....	7,420		1907.....	19,000	167
1902.....	7,750	120	1908.....	25,000	97

Probable Rise in Value.

Aluminum ingots (98.99 per cent.) are now quoted in trade journals at £85 per ton net, or 9.1d. (18.2 cents) per pound, but sales are reported at prices much below this figure. The *Frankfurter Zeitung* stated at the end of last year that sales were being made in Germany at the rate of 120 marks per 100 kg., this being equivalent to £61 per ton (13.25 cents per pound), a fall of 12½ per cent., as compared with the price in October, just after the break-up of the syndicate. A disturbing feature in the situation at that time was the accumulation of large stocks of French aluminum in the metal dealers' hands, due to the fact that this metal can enter Germany from France duty free, and to forced sales by the French producers.

It is evident, however, that unless some modification and cheapening of the method of production occur, the

metal cannot remain long at this present exceptionally low value, for the most favorable estimate of the bare operating costs of production gives £61 per ton, while it is believed that the larger number of operating works cannot produce the metal under £80 per ton, or 8.5d. (17 cents) per pound. When one adds to this figure the interest on capital and depreciation, it is seen that the metal cannot for long be sold at its present abnormally low price, and that some recovery in value is probable. Any process which would enable bauxite, or other unrefined natural alumina earth, to be used directly in the electrolytic bath would greatly reduce the cost, and it is quite possible that such processes are now being worked upon on an experimental basis of operations either in France or America.

The Testing Society's Meeting at Atlantic City.

The full programme has been issued by the secretary, Prof. Edgar Marburg, Philadelphia, for the twelfth annual meeting of the American Society for Testing Materials. It will be held at the Hotel Traymore, Atlantic City, from Tuesday, June 29, to Saturday, July 3. The list of papers indicates a meeting fully equal in importance to any that have preceded. Special interest attaches to the data that will be presented showing results of tests of ingots and various finished forms of steel as made at the Watertown Arsenal, Mass. Wednesday afternoon, June 30, is reserved as a recreation period. On Thursday evening an informal dinner will be given to members and friends, and on Friday evening there will be an engineering smoker. The programme is as follows:

TUESDAY, JUNE 29, 3 P.M.

"The Desirability of Standardizing the Testing of Insulating and Other Materials." By C. E. Skinner.
Report of Committee W—On Standard Specifications for Hard Drawn Copper Wire. By J. E. Capp, chairman.
Report of Committee D—On Standard Specifications for Paving and Building Brick. By L. W. Page, chairman.
Report of Committee P—On Fireproofing Materials. By I. H. Woolson, chairman.
Report of Committee O—On Standard Specifications for Coal. By J. A. Holmes, chairman.
"Fuel Investigations, U. S. Geological Survey: Progress During the Year Ending June 30, 1909." By J. A. Holmes.
"The Effect of the Various Constituents of Coal on the Efficiency and Capacity of Boiler Furnaces." By D. T. Randall and Perry Barker.

TUESDAY, JUNE 29, 8 P.M.

Annual address, "Engineering Responsibility." By the president, Dr. Chas. B. Dudley.
"Notes on Tests of Ingots and Derivative Shapes in Progress at Watertown Arsenal, Mass." By J. E. Howard.
"The Closing Up of Blowholes in Steel Ingots." By H. M. Howe.
"Further Investigations of Broken Steel Rails." By Henry Fay and R. W. G. Wint.
"An Investigation of a Defective Open Hearth Steel Rail." By Robert Job.

WEDNESDAY, JUNE 30, 10 A.M.

On Steel.
Report of Committee A—On Standard Specifications for Iron and Steel. By W. R. Webster, chairman.
Report of Committee R—On Uniform Specifications for Boilers. By E. D. Meier, chairman.
Report of Committee M—On Standard Specifications for Staybolt Iron. By H. V. Willie, chairman.
Report of Committee F—On Heat Treatment of Iron and Steel. By H. M. Howe, chairman.
"Some Notes on the Heat Treatment of Steel." By William Campbell.
"Detailed Fractures of Cold Rolled Rails at Low Temperatures." By P. H. Dudley.
"Elongation and Ductility Tests of Rail Sections Under the Manufacturers' Standard Drop Testing Machine." By P. H. Dudley.
"Dark Carbon Streaks in Segregated Metal of 'Split Heads' of Rails." By P. H. Dudley.

WEDNESDAY, JUNE 30, 8 P.M.

"Measurement of Impact Stresses." By B. W. Dunn.
"The Testing of Galvanized and Other Zinc-Coated Iron." By W. H. Walker.
"Tests of Standard and Bethlehem I-Beams and Bethlehem Girders." By Edgar Marburg.
"The Permanent Mold and Its Effect on Cast Iron." By E. A. Custer.

THURSDAY, JULY 1, 10 A.M.

On Steel and Iron.
Report of Committee U—On the Corrosion of Iron and Steel. By A. S. Cushman, chairman.

"Notes on Corrosion Tests of Iron and Steel." By R. B. Carnahan, Jr.
"Notes on Tests of Steel Columns in Progress at Watertown Arsenal, Mass." By J. E. Howard.
"The Physical Quality of Steel Which Has Been Subjected to Compression During Solidification." By Bradley Stoughton.
Discussion to be opened by Henry M. Howe and J. E. Howard.
Report of Committee V—On Standard Specifications for Cold Drawn Steel. By C. E. Skinner, chairman.
"An Interesting Driving Axle Failure." By M. H. Wickhorst.

THURSDAY, JULY 1, 3 P.M.

On Cement and Concrete.

Report of Committee C—On Standard Specifications for Cement. By G. F. Swain, chairman.
Report of Committee I—On Reinforced Concrete. By F. E. Turneaure, chairman.
"Tests of Plain and Reinforced Concrete Columns." By M. O. Withey.
"Suggestions as to the Practical Use to Be Made of Cement Testing." By R. K. Meade.
"Further Tests of Reinforced Concrete Beams Under Off-Repeated Loading." By H. C. Berry.
"Tests of Bond of Steel Rods Imbedded in Concrete by Three Methods." By H. C. Berry.
"Concrete Reinforced by Nails." By L. S. Moisseiff.

FRIDAY, JULY 2, 10 A.M.

Report of Committee E—On Preservative Coatings for Iron and Steel. By S. S. Voorhees, chairman. Report of the Subcommittee on Linseed Oil. By G. W. Thompson.
"Paints for Concrete—Their Need and Requirements." By G. D. White.
"Principal Features of a 1,200,000-lb. Testing Machine with Special Reference to a New System of Transmitting the Pressure Developed in the Hydraulic Cylinder to the Scale Beam." By T. Y. Olsen.
"A Machine of New Design for Hardness Tests." By T. Y. Olsen.
"Notes on the Bearing Value of Rods Imbedded in Concrete." By R. A. Cummings.
"Some Tests of Concrete Piers Under Varying Heights and Bearings." By Edgar Marburg.
"Disintegration of Fresh Cement Floor Surfaces by the Action of Smoke Gases at Low Temperatures." By A. H. White.

FRIDAY, JULY 2, 3 P.M.

On Bitumens and Oils.

"The Effect of Free Carbon in Tars from the Standpoint of Road Treatment." By Prevost Hubbard.
"Methods for the Examination of Bituminous Materials in Use in Highway Construction." By Clifford Richardson and C. N. Forrest.
"Bituminous Materials for Use in and on Road Surfaces, and Means of Determining Their Character." By Clifford Richardson.
"Viscometer for Heavy Road Oils." By A. W. Dow.
"Improved Instruments for the Physical Testing of Bituminous Materials." By Herbert Abraham.
"A Machine for Testing the Ductility of Bituminous Paving Cements." By F. P. Smith.
"Notes on Testing Turbine Oil." By Robert Job.
"A Further Development of the Penetrometer as Used in the Determination of the Consistency of Semi-Solid Bitumens." By C. N. Forrest.
"Conditions Affecting the Determination of Carbenes in Bitumens of Carbon Tetrachloride." By C. N. Forrest and D. B. W. Alexander.

SATURDAY, JULY 3, 10 A.M.

Report of Committee B—On Standard Specifications for Cast Iron and Finished Castings. By Walter Wood, chairman.
Report of Committee K—On Standard Methods of Testing. By Gaetano Lanza, chairman.
"Some Results of Dead-Load Bending Tests of Timber by the Use of a Recording Deflectometer." By Harry D. Tleman.
"The Effect of Tension on the Shearing Strength of Rivet Steel." By E. L. Hancock.
"The Structural Material Testing Laboratories, U. S. Geological Survey: Progress During the Year Ending June 30, 1909." By R. L. Humphrey.
Report of Committee L—On Standard Specifications for Clay and Cement Sewer Pipes. By Rudolph Hering, chairman.
Report of Committee Q—On Standard Specifications for the Grading of Structural Timber. By Hermann von Schrenk, chairman.

The annual report of the Executive Committee will be presented at the opening session, at which will be held the election of officers.

The Sterling Machine Works, Sterling, Ill., will increase its capital stock from \$50,000 to \$200,000 for the purpose of extending its facilities to include the manufacture of automobiles especially designed for farm and commercial use. The company will, for the present at least, continue the manufacture of farm implements, including the Sterling corn elevator, which, though new, is said to be a very practical machine.

Manufacturers' Standards Improving.

Higher Qualities of Goods Aimed At.

A wave of commercial honor and higher business ethics is rising and daily gaining impetus among manufacturers throughout America. The tide seems to be turning from the policy of questionable qualities at low prices to higher qualities at fair profits.

The Supply Associations Take the Initiative.

The first indication that manufacturers in considerable number were beginning to awaken to the situation was seen last February, at the meeting of the Executive Committee of the American Supply and Machinery Manufacturers' Association. At that meeting the famous Declaration of Principles of that organization was adopted, which placed the members—comprising many of the largest manufacturers of machinery and supplies in the United States—on record as being opposed to the three great evils in commercial life to-day—namely, unfair competition, depreciated qualities, and depleted profits. The recent adoption of the report of the Executive Committee by the entire association marks a radical advance. A second step, whose possibilities have even greater magnitude than the first, was taken at the annual convention of the National Supply and Machinery Dealers' Association at Pittsburgh on May 13. This association, recognizing that manufacturers had quite frequently been furnishing them inferior goods, which did not offer protection to the user, unanimously adopted a resolution calling for the standardization of many lines of mill supplies. A committee consisting of both manufacturers and dealers was appointed to investigate the situation. The action taken by both these important branches of trade comes as a result of conditions which have been becoming more and more pronounced for the past ten years.

For the benefit of buyers of machinery and supplies, and especially those dealers in machinery and supplies who were not present at Pittsburgh, some idea will be given of the importance of the measures adopted by citing conditions as they have been developing for a number of years.

When industrial America was young and every owner of a plant was the active manager of it, he was able to know what he was buying; his wants were fewer, his purchases were smaller, and it was not hard to keep a check on the quality of the goods which were being furnished him. The manufacturer then took pride in producing the best possible values in the article which he turned out. This attitude of the American manufacturer gave his products a distinctive reputation. But this condition was not always to exist. With the growth of large corporations, for whose requirements great quantities of machinery and supplies were bought, it became necessary to assign to some employee the duty of attending to the buying, and the purchasing agent thus charged with this responsibility found so many duties devolving upon him that he was seldom able to inspect his purchases after their delivery.

Prices Out and Quality Lowered.

Those who supplied the various products used in the factories of these great corporations realized the conditions thus brought about and, to get the business, resorted to that bane of competition—cutting prices. Soon the manufacturers in many lines found that purchasing agents would buy almost any article which was supposed to be standard from the lowest bidder. Since the purchasing agent was usually not in a position to investigate where the real merit lay in the goods which he bought, unscrupulous manufacturers solved the problem of getting business by quoting low prices on claims of value, but delivering goods which corresponded to the low prices made. This condition has for several years been injuring the reputation of various lines of American manufactures. Honest manufacturers who were delivering the best quality of goods, and living up to their claims of value, have been falling behind because they could not meet the unfair competition forced upon them

by manufacturers who were less honest, who made the same claims of value at lower prices, but who failed to deliver what was claimed.

It was this condition which forced itself to the attention of the American Supply and Machinery Dealers' Association, and it was this condition which led to the organization going on record as absolutely opposed to this unfair sort of competition, which would ultimately lead to the general discrediting of anything of American manufacture. It was this same condition which led the National Machinery and Supply Dealers' Association, in conjunction with the American Supply and Machinery Manufacturers' Association, to take up the question of standardizing every possible article of manufacture in the mill supply and machinery field.

Charles F. Aaron Leads the Attack on Poor Quality.

In both these organizations the evils above described were first brought to the front by Charles F. Aaron of the New York Leather Belting Company, who was president of the American Supply and Machinery Manufacturers' Association. The unfairness of conditions in the manufacture and sale of leather belting was recognized by Mr. Aaron, as conditions not only in his own mind but acknowledged by all. Mr. Aaron went to Pittsburgh with a plan for standardizing leather belting, which it was generally conceded would absolutely protect the user of belting from fraudulent deliveries, and which would place the manufacture of leather belting on a higher plane than it had ever been in the past. Though the specific plan of Mr. Aaron was not adopted by the conventions, it being deemed advisable to take up, through a committee, the standardizing of several lines in addition to leather belting, it is believed that it should be cited in detail, so that the users of machinery and supplies may get some idea of what the standardization of any product which they buy will mean in the protection they will receive from it.

It is probable that in the manufacture and sale of leather belting there is more room for fraudulent deliveries and misquoted values than in any other field. The average buyer of belting is not a leather expert; it is difficult for him to distinguish between the first quality leather belt cut from center stock and belly stock belt, provided both are polished up and made slick and shiny. The buyer of belting must depend largely on the claims of value which the manufacturer makes for his goods; he rarely sees the belting when it is delivered, and he probably could not tell whether he was getting best quality even if he saw it.

Knowing this condition to be general, belting manufacturers have quite generally taken advantage of buyers; they have slashed prices, made claims of highest value, and have often delivered goods of inferior qualities on these claims. In many cases where bids have been asked on specifications of the highest type there has been a difference of 50 per cent. between the highest and lowest bidders. In many cases the lowest bidder could not buy raw material of the best quality at the price at which he agrees to furnish the finished product.

The Aaron Standard Specification for Belting.

This condition is the one which Mr. Aaron faced in drawing up a plan which would protect the users of the products in his line from fraudulent practices by manufacturers. The first thing that is proposed is the adoption of a standard specification for first grade belting. The specification is to include these essentials, which belting manufacturers generally concede must be met to insure the production of a first-class belt:

1. Belting made from oak-bark tanned butts.
2. Only center portions of hide used.
3. Strips put into belts not to exceed 4 ft. 6 in. in length.
4. Weight about 16 oz. to the square foot.
5. Every strip for each width of belt taken from definite fixed location in the hide.

As a second step in his plan, it is proposed that a stamp be adopted which shall be recognized as the national stamp of quality for first grade belting. This stamp shall be the property of the supply dealers in the United States and be in charge of a national committee. It shall be loaned to such belt manufacturers as prove that they are capable of manufacturing belting according

to this standard of specifications. The appearance of this stamp on any leather belt would mean that the belt was built according to the best specifications. A violation of specifications by a manufacturer would mean a heavy penalty or the withdrawal of the stamp which would place the mark of quality on the goods manufactured.

As a further protection to the user of belting, Mr. Aaron proposes this method of enforcing the living up to specifications: The most important problem which confronts any buyer of belting is to know just how to distinguish between high grade and low grade belting. Fortunately, nature has provided a means by which it is possible for any one to check very closely the quality of leather he is getting, provided there is a system of cutting adopted, as in paragraph 5 of the specifications. By bending a piece of belt the nature of the pit or kink of the leather will show very closely the location from which the piece of leather was cut. By having manufacturers adopt a uniform system of cutting, so that each width of belting is cut from some fixed location in the hide, the user of belting will be able by comparing this piece with a belting butt cut into strips, as shown in a chart supplied, to check with certainty whether he is having delivered belting cut from this location or from some location nearer the belly. With this double-bladed axe which the user of belting would be enabled to hold over the head of the manufacturer, he has not only a standard of specifications with a stamp to insure quality, but a method of checking these specifications, so that the manufacture of belting would be obliged to deliver what he claimed or forfeit the confidence and business of the buyer.

Mr. Aaron's plan for protecting the buyer of belting and standardizing the line should receive the careful attention of manufacturers, dealers and buyers as an example of what may be done in other lines. Such methods for maintaining high quality in every line of manufacture will undoubtedly meet opposition on the part of those manufacturers whose business is conducted on a price cutting basis, but it is believed that the large manufacturers in all lines prefer building their products for length of service rather than for length of discount. Buyers of machinery and supplies are known to be unanimously in favor of such practices in manufacturing. An advance movement toward betterment of quality in all lines should receive the hearty support of every manufacturer.

Ontario's Lake Superior Iron Ores.*

TORONTO, May 29, 1909.—A report by F. A. Hille on the examination of some iron ore deposits in the Thunder Bay and Rainy River districts, in this province, has recently been issued by the Dominion Department of Mines. Though the report is published only now, the author's letter of transmission is dated May 1, 1907. Mr. Hille directs special attention to the greater Animikie iron range because of its similarity to the Mesaba and other iron ranges on the United States side of Lake Superior. There are two large deposits of titaniferous iron ore east and west of Port Arthur which can be commercially utilized in the production of pig iron and ferro-titanium by means of the electric furnace. There are also, as the author points out, large areas covered with jasper and high grade magnetite in a banded formation. As these minerals separate easily, the iron could be used after magnetic separation. Deposits of this kind occur on the Kaministiquia River, on Green Water Lake and on Hunter Island. Then there are the Michipicoten iron range, that of Hutton Township in the Nipissing District and others of less importance in the eastern part of Ontario.

The Mattawin Deposits.

The iron ore bodies along the Mattawin River are described as perhaps the largest deposits of magnetite of which we have any knowledge. They are first met with west of the forty-seventh milepost of the Canadian

Northern Railway westward from Port Arthur, and extend in an unbroken stretch to the fifty-first milepost. Then there is a gap until a point is reached $4\frac{1}{2}$ miles further up the course of the river, where ore is again found. If the impurities can be economically separated, an ore of at least 50 per cent. metallic iron content can be depended upon. As to convenient sources of fuel supply for the working of these ores, Mr. Hille believes they are to be found in the peat bogs of this province. The Martin Ziegler peat coking process might be serviceable. The quality of coke produced from peat being of high excellence and the province's resources of peat being large, he considers this fuel too important to be omitted from any discussion of the problem of Ontario's iron ore development.

Beginning at the extreme east with location W. 211, Mr. Hille describes the locations one by one. In its natural state the ore of some locations runs low in iron and high in silica. The iron is found in some cases to be as low as 20 per cent. He experimented with an ore taken from W. 216 of the following composition: Iron, 24.16 per cent.; silica, 52.07; phosphorus, 0.14; sulphur, 0.06. As the result of concentrating, he was able to reach the following:

	Per cent.
Iron	66.5
Silica	0
Phosphorus	0.008
Sulphur	0.002

A phenomenally large ore deposit is found in W. 218. The ore on this location is prominently exposed on a hill 202 ft. high. In five of the seven samples the iron content was steadily about 36 per cent. In another it was less than 35 and in the seventh it was 24.82. The silica did not in any case fall below 40 per cent. The total length of this deposit is 3351 ft. and its width is 726 ft. Its depth is very great. Locations R 476 and 484, on the north bank of the Mattawin, are notable for the high percentage of iron and the falling in the percentage of silica. Typical analyses showed 51.48 per cent. iron, 25.95 per cent. silica, 0.25 per cent. phosphorus, 0.04 per cent. sulphur. Some samples ran much higher, one showing 60.63 per cent. iron and 15.26 per cent. silica.

Magnetic Ore Deposits on the Atikokan River.

Mr. Hille says the Atikokan ore deposits are almost a counterpart of the Sudbury nickeliferous pyrrhotite deposits. He has held from the outset, and now indisputable evidence bears out his opinion, that the rock masses standing out in the Atikokan field are gabbro dikes. The surface of a certain portion of these dikes is covered with a thick layer of iron ore, sometimes extremely pure. Tests made gave results high in iron, low in silica and even in sulphur and nickel. Three samples show as follows:

	No. 1. Per cent.	No. 2. Per cent.	No. 3. Per cent.
Iron	62.4	66.5	67.2
Silica	7.1	3.2	2.1
Phosphorus	0.02	0.015	0.036
Sulphur	Trace.	0.01	0.07
Nickel	Trace.	Trace.	Trace.
Titanium	Trace.	Trace.	Trace.
Magnesia	0.34	Not det.	Not det.
Lime	0.13	...	...

At a depth of 200 or 300 ft. the drill cores show both much more nickel and much more phosphorus than were in the surface samples above given. The phosphorus of the deep ore was usually found to be present in measure beyond the Bessemer limit.

E 10 and 11 of the Atikokan range are the Atikokan Iron Company's properties, which have already been described in *The Iron Age*. In locations R 400 and 401 was found ore high in iron, one sample assaying as follows:

	Per cent.
Metallie iron.....	62.02
Phosphorus	0.08
Sulphur	1.26
Titanium	0.10

At the time of the examination of these locations a number of miners sent in by the United States Steel Corporation were prospecting in a tunnel that is into the dike there, and at other points.

* Also "Report on the Mining and Metallurgical Industries of Canada," *The Iron Age*, January 28, 1909, p. 313, and "Pig Iron Making in Ontario," *The Iron Age*, March 18, 1909, p. 911.

The Animikie Series.

The Animikie, the name given in Canada to the rock formation in which iron ore is found is, says Mr. Hille, as extensively developed in the Thunder Bay and Rainy River districts as in any other locality of Lake Superior. It appears, he says, that the Animikie rocks are identical with the Mesaba and with the iron bearing rocks of all other Lake Superior ranges. Their area on the Canadian side is given as 100 miles from east to west and 25 miles from north to south. The stretch of them examined by Mr. Hille is in the vicinity of Loon Lake, about 25 miles from Port Arthur. Near the northern margin of the Animikie area diamond drill tests show the thickness of the formation to be from 700 to 1200 ft. All these borings yielded good evidence of the presence of hematite ore. In the neighborhood of Loon Lake the formation becomes shallow. As to the prospects of obtaining much ore in the Animikie, Mr. Hille says:

It is probably only a question of time, and also of exploration, for us to find ore in our rocks in quantities as great as on the Mesaba. I can see no reason why this should not be the case, since the geographical and petrographical conditions are identical, and we have the added advantage of the greater thickness of the Animikie series. It is surely incredible that an imaginary boundary line should have placed a limit on the deposits of hematite ore, produced through natural phenomena which were in activity in our district as well as in that a few miles away from us. But it is far more likely that the fact of little or no development work having yet been done here has so far prevented their discovery.

C. A. C. J.

PERSONAL.

Judge E. H. Gary, chairman of the United States Steel Corporation, has been elected a director of the Astor Trust Company, New York.

Charles K. Thomas, formerly sales agent for the D. T. Williams Valve Company, Cincinnati, Ohio, has been elected vice-president of that company, succeeding Francis X. Pund, deceased.

J. H. Hearing, for a number of years general superintendent of the Oliver Iron Mining Company's iron mines at Eveleth, Minn., has been made assistant general manager of the company, with headquarters at Duluth. R. J. Mitchell succeeds Mr. Hearing at Eveleth.

Sir Charles McLaren, for 30 years connected with iron manufacture in Great Britain, has been elected president of the British Iron Trade Association for the coming two year term.

The appointment of Herman S. Hastings as commissioner of the United States Metal Trades Association of the Pacific Coast was confirmed by the Executive Council at a recent meeting at Portland, Ore. The main office will continue at Seattle for the present, but Mr. Hastings will spend a part of his time at the Portland office. James W. Van Cleave, St. Louis, who retired as president of the National Association of Manufacturers at the recent New York meeting, and James A. Emery of the Citizens' Industrial Association of America, are expected to visit the Pacific Coast cities early in June. The metal trades associations of Spokane, Portland and Seattle are arranging for meetings in those cities which will be addressed by Messrs. Van Cleave and Emery.

Howard A. Nauss has been appointed superintendent of the Reading Iron Company's furnace at Emaus, Lehigh County, Pa., which has recently been overhauled and improved.

The Franklin Trust Company, Philadelphia, has elected Stedman Bent, purchasing agent of the Pennsylvania Steel Company, a director.

Philip T. Dodge, president of the Engineers' Club, New York, and W. H. Fletcher, past president, have gone abroad.

Among those who have been elected to membership in the Iron and Steel Institute at the recent annual meeting at London are Arnold M. Bennett, Montreal Steel Works, Ltd., Montreal; Dr. A. S. Cushman, Washington, D. C.; Dr. Henry Fay, Boston; M. T. Lothrop, Halcomb Steel Company, Syracuse, N. Y.; D. A. Lyon, Noble Electric Steel Company, Heroult, Cal.; H. A. Pardee, Sanderson Bros. Steel Company, Syracuse, N. Y.; H. A.

Schwartz, Indianapolis, Ind.; A. B. Stewart, Baldwin Locomotive Works, Philadelphia; Emanuel Tanitzky, Duquesne, Pa.; L. A. Way, Coraopolis, Pa., and F. A. Weymouth, Maryland Steel Company, Sparrows Point, Md.

W. L. Glessner, Wheeling, W. Va., has resigned as president of the Portsmouth Steel Company, Portsmouth, Ohio, but still retains his interests in the company and also in the Whitaker-Glessner Company. Alexander Glass succeeds Mr. Glessner as president and general manager of the Portsmouth Steel Company, and J. R. Houston is resident manager, at Portsmouth. Donald Drennan, who was secretary of the Portsmouth Steel Company, has been succeeded by T. H. Jones, formerly chief clerk of the Wheeling Corrugating Company.

D. M. Parry, for 27 years head of the Parry Mfg. Company, Indianapolis, Ind., and former president of the National Association of Manufacturers, has resigned to enter another field, although he has not withdrawn his holdings in the company. Edward R. Parry has been elected president; St. Clair Parry, vice-president; A. M. Parry, secretary, and Lot D. Guffin, treasurer. The company manufactures vehicles.

The Museum of Safety and Sanitation, New York, announces the election of Arthur Williams to the Board of Trustees. Mr. Williams is the general inspector of the New York Edison Company and a member of the American Institute of Electrical Engineers. In 1907 he was decorated by the French Government. He is a member of the American section of the International Housing Congress and was a member of the eighth International Congress of Social Insurances at Rome, 1908. Mr. Williams will serve on the Lecture Committee of the Museum, which has arranged an extensive itinerary for Dr. William H. Tolman, director, covering October to March and embracing a long list of cities in various parts of the country.

Herman Nieter, for the past year and a half New York agent for the Canton Boiler & Engineering Company, has been appointed sales manager for the same company, with headquarters at Canton, Ohio.

Edmund L. French, assistant manager of the Sanderson Brothers Steel Company, Syracuse, N. Y., subsidiary of the Crucible Steel Company of America, has been appointed manager of the Sanderson Works and assumes his duties at once. He is a graduate of Syracuse University and began with the steel company in 1897 as a chemist, then becoming sales manager and in 1908 assistant manager. He made a special study of iron and steel chemistry in the Royal School of Mines in Germany. The office of manager had been vacant for several months.

Berthold Floersheim, vice-president and general manager of sales of the Best Mfg. Company, Pittsburgh, will sail for Europe June 19, to be gone about two months.

W. T. Mossman, advertising manager for the Jones & Laughlin Steel Company, Pittsburgh, has sailed for Europe, to be gone a month or six weeks.

Joseph G. Walton has been appointed Pittsburgh representative of Eaton, Rhodes & Co. and will at once open a branch office in that city. He was formerly connected with the sales department of Walter Wallingford & Co., Cincinnati.

Murray & Rogers, Pittsburgh, sales agents for the Janesville Iron Works, Hazelton, Pa., report the sale of a 15 x 24 x 40 x 15 x 24 in. horizontal triple expansion direct acting pump to the Citizens' Water Company, Washington, Pa.; to the Merchants' Coal Company, Johnstown, Pa., a triple expansion double acting plunger pump, motor driven; to the Aluminum Company of America, St. Louis, Mo., a 14 x 20 x 12 x 18 in. boiler feed pump; to the Carnegie Steel Company, Youngstown, Ohio, a large centrifugal pump.

The Pacific entrance to the Panama Canal is hereafter to be known as Balboa, in honor of the discoverer of the Pacific Ocean. It was heretofore known as La Boca, and was changed by order of the President.

The Frick Electric Furnace.

At the meeting of the Iron and Steel Institute in London, May 13 and 14, W. Rodenhauser, Saarbrücken, Germany, read a paper on the "Electric Furnace and Electrical Process of Steel Making," having particular reference to the Röchling-Rodenhauser furnace, a description of which was given in *The Iron Age* of September 17, 1908, page 780. Reference was made in the paper to the characteristics and performance of all the principal electric arc and reduction furnaces. Particular interest attaches to the mention made of the new Frick induction furnace, the invention of O. Frick, who was present at the London meeting. Mr. Rodenhauser made a comparison of the Frick and Kjellin furnaces. The principal difference between them, he said, is that in the former the primary windings are placed above and below the annular hearth, instead of within it. The heat is produced in exactly the same way in both furnaces, the grooved annular hearth being the characteristic feature. The author added: "These furnaces have no side doors and the operations are watched and regulated by lifting off the covers of the grooved annular hearth section by section. The peculiar shape of the hearth naturally prevents the removal or changing of the slag, and so it should be pointed out that these furnaces are only adapted to conditions where comparatively pure materials are to be melted or alloyed."

Mr. Frick, in the discussion of the paper, said that he had been careful to keep from the public any information about his furnace, on which he had been working for six or seven years. At the present time one of his furnaces is in use at Essen, having been started in operation there in August, 1908. It has been so satisfactory to the firm of Krupp that the latter has taken over the German patents. Referring to the statement of Mr. Rodenhauser that the Frick and Kjellin furnaces have no side doors and that the peculiar shape of the hearth prevents the removal of the slag, Mr. Frick said that in his furnace the slags are worked very conveniently. The top of the furnace has a single cover, which is made to rotate by a motor, so that by having one opening it is possible to inspect the whole of the ring shaped bath. When it is desired to skim off the slag, one man stands on the cover and puts down a skimmer, bringing forward the slag to the spout, where another man gets it out very easily. The speaker thought that after dephosphorization, and in order to avoid sending the phosphorus back into the bath, the safe way is to clear the entire surface in order to get out every bit of slag. This can be done, he said, at a small expense of power. Referring to Mr. Rodenhauser's claim of a great advantage in low primary cost of installation, the speaker considered that this is not an important factor. On the Krupp installation of the Frick furnace \$375,000 has been spent, and of that only \$20,000 to \$25,000 was spent on the dynamo. The difference between such a dynamo and the ordinary dynamo might be something like \$5000, which is of relatively small importance.

In general, the speaker considered that an electric furnace could not compete with the Bessemer process. It is of use for the very high temperature that can be had from it. Referring to the remark of a previous speaker, who used recovery gas at his open hearth works, Mr. Frick suggested that if the efficiency of that gas in producing steel was calculated it would be found to be about 33 1-3 per cent., and that the total efficiency of coal in the open hearth process could be reckoned at 25 per cent. Thus, for a certain amount of coal an equal amount of work could be done in an electrical furnace. The speaker agreed that it could not be done at the same price, because the primary cost would be much higher in the latter case. When worked in combination with the Bessemer or the Siemens-Martin processes he considered that the electrical furnace has come to stay, taking into account the higher grades of material it can be made to produce. At the Krupp Works they had been anxious to make an extra high temperature steel and had attained 1650 to 1680 degrees C., which was much too high for steel.

T. Rowlands said that for some time he had been associated with the American Electrical Furnace Company, which had a plant at Niagara Falls for the demonstration of the induction furnace. In one case steel had been melted there containing 1.2 per cent. of carbon, with a consumption of 400 kw.-hrs. per ton. The charge was melted in an hour and a half. The furnace was designed to tap every 4 hr. In other cases 560 kw.-hr. per ton were required. For the melting of ferromanganese 520 kw.-hr. per ton had been used, and for manganese steel as low as 600 kw.-hr. per ton. It was the practice to leave a certain portion of the charge in the furnace in order to start the next charge. Reference having been made to the removal of the slag, he would say that skimming slag from the bath was a difficult matter. As compared with a power factor of 84, which had been referred to as very unusual, they had had continuous running at Niagara Falls at 80, and their lowest had been 79.

E. Adamson took exception to the suggestion of the paper that steel from the Heroult furnace was less homogeneous than from the Röchling-Rodenhauser furnace. That steel made in the Heroult furnace is perfectly homogeneous is indicated, he said, by 60 analyses of consecutive charges which he had before him. These showed maximum phosphorus of 0.016 and maximum sulphur of 0.026. The minimum phosphorus was 0.011, and the minimum sulphur 0.016. He thought these analyses showed much greater purity than the analyses which the author quoted.

A. Cooper suggested that for the purpose of rail making, until they could take metal over from the blast furnaces or the mixer, the electrical furnaces would not be very serious competitors with the basic open hearth furnace. In Middlesbrough, he said, it is quite easy to make in the basic open hearth furnace steel of the same composition as was given in the paper—namely, carbon, 0.75; silicon, 0.10; manganese, 0.67; sulphur, 0.044; phosphorus, 0.023. At one of the works with which he was associated, some 20,000 or 30,000 tons of rails had been produced of about that composition and capable of standing all the tests.

The Revere Copper and Kinsley Iron Properties Sold.

J. E. Conant & Co., auctioneers, Lowell, Mass., report the sale of the Revere Copper and Kinsley Iron & Machine companies' properties, at Canton, Mass., on Thursday and Friday, May 27 and 28. The real estate and water power privilege of the Revere Copper Company were sold on Thursday afternoon to the Plymouth Rubber Company for \$13,000. The real estate and water power privilege of the Kinsley Iron & Machine Company followed the sale of the Revere Copper Company and were disposed of in seven lots to various purchasers, for \$21,000. The first lot, the rolling mill lot, was purchased by the Plymouth Rubber Company, the purchaser of the Revere Copper Company. On Friday the more than 800 lots of machinery, product, stock and equipment were disposed of between 10 o'clock in the morning and 4 o'clock in the afternoon, the sum realized being slightly more than \$43,000, or about \$78,000 for the two days. The attendance on Thursday at the sale of the water power privileges was an absolutely good and sufficient one, but the bidding was not particularly active. There was no lack of interest, however, and the bidders were slow to finish. On Friday the attendance was exceptionally large and representative and tireless in its bidding. The contest for every lot offered was a fight to a finish. While the buyers from New England were in the majority, there were many from the Middle States and the West. On the whole, the sale was a success and the officials of the companies present made such expression.

The Standard Bridge Tool Company, Ferguson Building, Pittsburgh, has sold a No. 4 Thomas spacing table to the Manitoba Iron Works, Winnipeg, and a set of plate roll tables to the Jones & Laughlin Steel Company. The company reports an improvement in inquiries during the month.

Trade Publications.

Mill, Mine, Machinist and Railroad Supplies.—Pittsburgh Gage & Supply Company, Pittsburgh, Pa. Catalogue 6 1/4 x 9 1/4 in., 1796 pages. This book is fittingly called the "Encyclopedia of Supplies." It is bound in cloth and very completely indexed. A series of views of the various departments in the company's offices and plants gives an idea of the excellent facilities the company has for handling a voluminous business. These illustrations include views of the manufacturing department showing its pipe fitting shop, foundry and general machine shop and pattern and sheet iron departments. About everything in the way of supplies is listed, in addition to a large amount of special equipment. The supplies listed range from recording instruments for about every known purpose to a general line of steam accessories, foundry supplies, mining equipment of all sorts, feed water heaters, condensers, steam pumps, vacuum pumps, water tanks, chain grates, blacksmiths' tools, machine tool attachments, industrial cars, tracks, turntables, wheelbarrows, shovels, a general line of hardware and stoves and ranges for all purposes, including special coach and caboose stoves and such special equipment as office furniture and supplies, stable tents, camp beds and equipment, harness saddlery, hardware, stable supplies, &c. A regular order and rush order book accompanies the volume, together with some samples of special roofing.

Electrical Equipment.—General Electric Company, Schenectady, N. Y. Three bulletins and booklet. Bulletin No. 4658 shows a ball bearing street car trolley base. No. 4659 describes switchboard instruments for use on alternating current circuits. No. 4660, superseding No. 4594, is devoted to Tungsten economy diffusers. Booklet No. 3779 contains a list of snap switches.

Recording Instruments.—The Bristol Company, Waterbury, Conn. Two bulletins. Bulletin No. 103 describes recording instruments especially adaptable for blast furnaces and special attention is called to an electric time recorder which records every movement of the skip, rotary top, distributor, large and small bells, gauge rod, &c., the connections being made with small wires to simple contact switches at the controlling valves in the stock house or engine house. A sample record chart is shown and other illustrations include thermometers for making continuous records of dry blasts, recording pressure gauges for hot blast, &c. Bulletin No. 88 shows recording volt meters, ammeters and wattmeters.

Steam Pumps.—Dean Brothers Steam Pump Works, Indianapolis, Ind. Catalogue No. 77, 6 x 7 in., 76 pages. This is principally a list of parts of pumps with directions for operating the varied line of pumping equipment made by the company. Line drawings of pumping equipment with parts numbered are included, together with some useful tables of information and other data, such as hints on hydraulics, &c. The book should be especially interesting to operating departments.

Speed Reducers.—Foote Brothers Gear & Machine Company, 44 North Carpenter street, Chicago, Ill. Folder. Illustrates with the aid of line drawings the construction of a new spur gear speed reducer for use in transmitting power to slow speed machinery.

Staybolts.—Detroit Seamless Steel Tube Company, Detroit, Mich. Booklet. Calls attention to the Detroit hollow staybolt, which is manufactured by the seamless process and is adaptable for the staying of locomotives, marine and other types of boilers. Breaks in these bolts can be detected both inside and outside of the firebox, which minimizes the danger of explosion and other accidents.

Electric Motors.—Wagner Electric Mfg. Company, St. Louis, Mo. Two bulletins. Bulletin No. 82 is devoted to polyphase motors, which are made in standard sizes from 1 to 75 hp. The construction of the company's line of two-phase and three-phase motors is described in detail. Several illustrations show various applications of these motors, including the operating of a planer, air compressor, vertical drill, an overhead crane, power punch and shear, &c. Bulletin No. 83 describes single-phase motors in about the same manner, and they are shown operating a vacuum cleaner, a deep well pump, an organ blower and other equipment, illustrating the wide variety of uses to which they can be applied.

Rail Joints.—Wolfe Automatic Rail Joint Lock, 2060 East Fourth street, Cleveland, Ohio. Folder. Describes a device for locking rail joints which consists of an elongated nut screwed on the ordinary track bolt in place of the usual nut. At the end of these nuts are holes through which a bolt is passed so that adjoining nuts can be held by the bolt with the aid of a cotter pin holding a malleable cam shaped piece between the nuts. An iron wedge inserted between the latter section and the fish plate locks the joint as the cam shaped piece turns on its bolt, taking up the slack due to stretching or expansion and allowing sufficient movement for the contraction of the bolt.

Automatic Draft Control and Air Heaters.—Green Fuel Economizer Company, Matteawan, N. Y. Two bulletins. No. 121 is entitled "Automatic Draft Control for Steam Boiler

Furnaces," and describes and illustrates appliances for regulating the draft for steam boilers so that the pressure within the firebox is at all times neutral. This system was described in *The Iron Age*, April 22, 1909. Bulletin No. 118, in booklet form, shows the Green hot blast heater, in which the pressure of steam is employed to push the air through and out of the pipes. This heater, it is claimed, cannot become air bound, and all of its surface is active in transmitting heat. It was described in *The Iron Age*, January 28, 1909.

Pumps.—Henry R. Worthington, 115 Broadway, New York. Three bulletins. No. W165 describes the Worthington volute centrifugal pumps for low-head service and shows a large dry-dock pumping unit at League Island, Philadelphia, and a sectional view of the Worthington standard volute pump. A motor driven and an engine driven machine are shown and directions for ordering are included. No. W166 pertains to triplex house tank pumps of the vertical single acting type, and contains brief descriptive matter. No. W169 contains an illustration of a pot valve heavy pressure boiler feed pump.

Water Heaters.—Alberger Condenser Company, 95 Liberty street, New York. Catalogue No. 13, 6 x 9 in., 16 pages. The Wainwright water heater for hot water service systems, the tubes of which are seamless drawn copper with walls so corrugated that the water passing through them is driven in a zigzag course, is illustrated and fully described. An ideal water service system, fitted with the Wainwright heater and automatic controller, is shown, and the adaptability of the system for heating Turkish bath tanks and other special use is described.

Standard Gauges.—The Grönkvist Drill Chuck Company, 18 Morris street, Jersey City, N. J. Catalogue. Size, 8 1/4 x 11 in.; 27 pages. Describes the character and use of the gauges made by C. E. Johansson, Eskilstuna, Sweden, which are so remarkable for their accuracy. The blocks have practically absolutely parallel and flat surfaces which is shown by the fact that a number of them pressed into intimate contact so as to exclude the air will be held by molecular cohesion and atmospheric pressure. By thus combining two or more gauges a wide range of measurements are possible. These gauges are claimed to be accurate within 0.000001 in. A set containing 81 blocks in connection with the standard plug gauge and holder furnished will give 300,000 different gauge sizes by 0.0001 in. No. 2 set, with 72 blocks, gives 10,000 different gauge sizes in connection with the holder, varying by 0.001 in. The No. 3 and No. 4 sets contain 15 and 11 blocks, respectively, measuring the common inch sizes, with allowance for plus or minus limit errors of 0.001 or 0.002 in. Metric gauges are also made. The uses of the gauges in testing plug, snap and ring gauges, laying out dies and checking up other very accurate work are explained at some length.

Blast Furnace Specialties.—H. L. Wickersham, Steubenville, Ohio, district sales agent for McCarthy specialties. Catalogue 6 x 9 in., 581 pages. Drop valves, equalizing valves, steam apparatus for holding iron notch guns, metallic packing for hot blast valve stems, spray pipes, three-way and four-way valves, are shown with the aid of reproductions of blue prints, and a list of users of the McCarthy products is given.

Sheet Packing.—H. W. Johns-Manville Company, New York. Booklet. Describes Permanite sheet packing for superheated steam and high pressures which is especially adaptable for standing the highest steam pressures and temperatures.

Hoisting Engines, Bucket Elevators, &c.—American Hoist & Derrick Company, St. Paul, Minn. Circular. Shows an American hoisting engine operating an automatic dumping concrete and material bucket elevator. This apparatus is operated by a multiple automatic switch, which can be moved to any desired dumping point, at the will of the operator. The bucket is controlled by an automatic latch which, when it strikes the trap on the switch, allows it to automatically dump its contents.

Electrical Instruments.—Weston Electrical Instrument Company, Newark, N. J. Circular. As a novel form of advertising this company is issuing free lessons from "The Weston Correspondence School." This first one deals with the economy of buying high grade electrical instruments.

Concrete Reinforcing.—Corrugated Bar Company, St. Louis, Mo. Bulletin No. 7. One in a series of technical treatments of designing methods in reinforced concrete construction. This one describes reinforced concrete conduits and sewers and contains instructions for using bars on that work, with explanatory diagrams. The book should prove especially valuable to practicing engineers.

Distributing Transformers.—Westinghouse Electric & Mfg. Company, Pittsburgh, Pa. Circular 1502. Contains information on alternating current distribution, covering transformers, lightning arresters, insulators, cross arms, &c. Considerable space is given to describing underground and overhead construction in congested districts. The circular contains 52 pages and is especially complete.

Automatic Water Weighers.—Willcox Engineering Company, Saginaw, Mich. Bulletin No. 10. A reprint of an article published in *Power and the Engineer*, February 23, 1909, which incidentally describes an installation of the Willcox automatic water weigher for measuring water supplied to a boiler during a rest. The author and engineer in charge of the test,

A. A. Cary, New York, found the apparatus particularly convenient and accurate for such work.

Twist Drills, Reamers, &c.—Cleveland Twist Drill Company, Cleveland, Ohio. Circular. Describes briefly the Peerless high speed reamers, Perfect double tang sockets and Paradox adjustable reamers.

Hydraulic Jacks.—Joyce-Cridland Company, Dayton, Ohio. Bulletin No. 33. A 32-page booklet of a uniform series showing this company's product, devoted especially to hydraulic jacks. A new speeding device is described by means of which the jack can be run quickly up to load where the speeding device automatically cuts out and leaves only the lifting pump in operation. Sectional views of the jack are shown, together with a number of standard machines.

High Speed and Other Special Steels.—William Jessop & Sons, Ltd., Sheffield, England, and 91 John street, New York. Booklet. Contains a number of views illustrating the processes of manufacturing Jessop steels, including interior views of the company's steel warehouse and works at Sheffield. Deals with high speed steels, sheet steel for saws, steel pens and other special steels which the company is prepared to supply.

Cranes and Hoists.—Shepard Electric Crane & Hoist Company, 50 Church street, New York. Bulletin No. 502. Illustrates and briefly describes several types of Shepard cranes and hoists, features of which are that the gears, brakes and bearings are completely protected and reservoir oiled. The company makes cranes for all standard purposes, and makes a specialty of designing hoists and cranes for special purposes.

Constant Speed Drive Milling Machines.—Brown & Sharpe Mfg. Company, Providence, R. I. Catalogue 6 x 9 in., 27 pages. Calls attention to the fact that these machines are constructed on the unit system whereby the different mechanisms are made independent parts. The machines are equipped with motor drive and can be operated with either a variable speed or constant speed motor. The various parts of the standard machines are shown and graphically described and a table of sizes of standard machines is included. This machine was described in *The Iron Age*, October 1, 1908.

Transmission Machinery.—Reeves Pulley Company, Columbus, Ind. Booklet. An attractive little leather bound pocket book called the "Engineer's Manual," for estimating on variable speed transmission, and contains practical and technical data necessary for making such estimates. It is compiled with a view to meeting the needs of salesmen in selling this equipment and for engineers. Some of the Reeves transmission equipment is shown and its adaptability to various problems in the power transmission estimating are explained. Directions for making inquiries are given, together with useful tables and dimensions of variable speed transmissions. The book is well illustrated and thoroughly indexed and sells for \$1 to anyone, or may be had free in paper binding.

Taps, Dies, Screw Plates, Die Stocks, Tap Wrenches, &c.—S. W. Card Mfg. Company, Mansfield, Mass. Contains a reprint of an article from the *American Machinist*, February 25, 1909, entitled "Proposed Elimination of the Old V Thread in Taps and Dies," and an editorial in the same issue advocating this course. There follows a list of sizes and pitches of threads for taps and dies, with price-list.

Turbines and Generators.—Ball & Wood Company, Elizabethport, N. J. Booklet. Pertains to the Rateau-Smoot low pressure turbine and generator, intended for operating on exhaust steam from noncondensing engines. Several views of a standard machine are given, together with a volume-pressure diagram showing the performance the equipment is capable of, and the machine is described in detail with the aid of line drawings. An installation in the American Sheet & Tin Plate Company's plant at Vandergrift, Pa., was described in *The Iron Age* January 7, 1909.

Power Transmission and Conveying Belting.—Robins New Conveyor Company, 72 Front street, New York. Booklet. Describes Balata belting. Balata is a vegetable gum similar to gutta percha or India rubber, which, it is claimed, is immune from oxidation. This is applied to a woven canvas belting in liquid form, producing an especially serviceable belting adaptable for driving, conveying and elevating. A belt conveyor carrying coal is shown, and some practicable rules for using the belting are included.

Rolled and Hammered Bar Steel.—Philadelphia Steel & Forge Company, Tacony, Philadelphia, Pa. Lists prices of tool, spring, cutlery and machinery steels, &c. A table of the Birmingham wire gauge with equivalents in decimal and fractional parts of an inch, and the weights of a square foot and a lineal foot 16 in. wide is given, also a table comparing Stubbs and Brown & Sharpe gauges, one of the decimal equivalents of common fractions of an inch, one of the weight of bar steel per foot and one of the weight of flat bar steel per foot.

Steel Plate Construction for Blast Furnaces.—William B. Pollock Company, Youngstown, Ohio. Pamphlet. One of a series illustrating important installations made by the company. Shows several views of the new furnace of the Youngstown Steel Company at Youngstown, Ohio. The installation includes a new stack, dust catcher, down-comer, hot blast and gas mains, hoist bridge, stock bins and trestles.

Alternators.—Crocker-Wheeler Company, Ampere, N. J. Bulletin No. 114, superseding No. 77. Describes coupled type alternating current generators, machines designed for use where it is impracticable to mount the armature on the shaft of the prime mover. Installations of this class of equipment are shown, one including five 4000-kw. generators.

Machinery.—Cincinnati Iron & Steel Company, Cincinnati, Ohio. Machinery list. Covers shears, punches and shears, bending rolls, hand power tools, chucks, clutches, brakes, electric tools, bolt cutters, cranes, hoists, concrete mixers, saws, shapers, lathes, planers, drills, milling machines, grinders, wood-working machinery, forges, hack saws and second-hand machinery, and gives tables of useful information.

Wire Rope Tramways.—A. Leschen & Sons Rope Company, St. Louis, Mo. Booklet. Contains a series of illustrations of a wire rope tramway furnished to George W. Jackson, Inc., of Chicago, Ill. The tramway is 8000 ft. long, and with the exception of a few hundred feet it extends over Lake Michigan, connecting a temporary crib out in the lake with the shore. It is used to transport rock and other material excavated in the construction of the new water supply tunnel for Chicago. The illustrations are interesting and include a passenger carriage which conveys the workmen over the lake to the crib. The rock is carried to the shore on the tramway and there it is crushed and used in making concrete.

Power Pumps.—The Goulds Mfg. Company, Seneca Falls, N. Y. Catalogue, 7 x 8 in., 191 pages. Views of the company's works are shown as the frontispiece, and following a treatise on the principles of the triplex power pump are a number of views of buildings and factory plants where the company's equipment is in use. Single acting triplex plunger pumps of a number of sizes are shown and described, together with special pumping equipment for water works in that type of machine. Double-acting triplex piston pumps are next taken up, and there follows a general line of pumping equipment, including some especially heavy machinery. A portable electric mine pump, double-acting piston vacuum pumps, oil pumping machinery and pumping accessories are also illustrated and described. Some space is given to centrifugal pumps, and useful tables, such as tables of friction of water in pipes, barometric pressure at different altitudes, table of capacity of pumps, &c., are included.

Grinding and Polishing Machinery.—Webster & Perks Tool Company, Springfield, Ohio. Pamphlet. Self-oiling bench grinders, floor grinders, self-oiling floor grinders, a special ring-wheel end grinder, special plate edge grinder and self-oiling buffing and polishing lathes are illustrated. The latter machines are equipped with special automatic oiling devices, a feature of which is an improved oil cup with sufficient capacity to keep the bearings lubricated for several days without refilling. In the center of the cup is inserted a tube at a distance from the bottom of which there are two holes for admitting the oil to the bearings and at the same time permitting any foreign particles to accumulate in the bottom of the cup, as in a trap.

Electrical Equipment.—Fort Wayne Electric Works, Fort Wayne, Ind. Three bulletins. No. 1112, superseding No. 1028, shows an inclosed direct current arc lamp for operating on power circuits, and illustrates the various parts with appropriate descriptive matter. No. 1115 describes single-phase integrating induction wattmeters, and No. 1116, superseding No. 1099, is devoted to the type DCM inclosed direct current multiple arc lamps.

Iron Pipe Fittings, Brass and Iron Valves, &c.—Pittsburgh Valve & Fittings Company, Barberton, Ohio. Catalogue, 5½ x 7¼ in., 244 pages. This is a well arranged cloth bound volume listing standard cast iron screwed fittings, extra heavy cast iron flange fittings, iron body gate valves, globe, angle, check and cross valves, regrinding brass globe, angle and check valves, brass gate valves, &c. Some special equipment in the way of extra heavy fittings and valves are shown, and sizes and prices are listed.

German newspapers report that the German Steel Syndicate has reduced the "tonnage dividend" on some products from 8 to 3 marks and on other from 5 to 2 marks. The "tonnage dividend" is the sum paid by the syndicate to the members in excess of the base price on which settlement is at first made. It is claimed that this measure was called for by the low prices realized on crude steel, notably for export, and the decline in the international markets for shapes. The Germans have reduced the export price on beams by 4 shillings and are now selling at £5 per gross ton, f.o.b. Antwerp.

The Pressed Radiator Company of America, Pittsburgh, manufacturer of Kinnear pressed radiators, for steam and hot water heating, recently shipped to the Japanese Government over 30,000 sq. ft. of radiators to be used in the Marine Hospital at Osaka.

NEWS OF THE WORKS.

Iron and Steel.

The National Mfg. Company, Atlanta, Ga., recently incorporated with a capital stock of \$100,000, has purchased the plant of the Georgia Plow Works in that city, which it will use for the manufacture of cotton ties out of scrap. The plant is located on a site of about 2 acres and has a frontage on the Southern Railroad. The company is in the market for three 5-hp. 220-volt low speed three-phase alternating current motors. R. M. Freeman is president.

Marshall Furnace, operated at Newport, Pa., by the Juniata Furnace & Foundry Company, blew out May 20 to await a more active market for its iron.

The Tennessee Coal, Iron & Railroad Company now has in operation four furnaces at Bessemer, Ala., running on foundry iron, which is one more furnace than was recorded in our recent statement. Its rolling mill at Bessemer has been put in operation after an idleness of some three months.

The rolling mill of the Western Steel Car & Foundry Company at Anniston, Ala., has been closed down for an indefinite period.

The Detroit Furnace Company, Detroit, Mich., banked its blast furnace May 17. It was still out of blast June 1.

The Central Iron & Steel Company, Harrisburg, Pa., blew in its second furnace May 6. For many months it had but one furnace in blast.

The Pennsylvania Steel Company now has three of its Steelton, Pa., furnaces in blast, No. 3 having been blown in May 4. In addition the Lochiel Furnace is producing spiegel.

One of the two Riverside furnaces of the National Tube Company at Benwood, W. Va., was blown in May 27 and the other May 30.

General Machinery.

The Illinois Central Railroad, which has under construction a banana cooling plant and power house at Dubuque, Iowa, for the use of the United Fruit Dispatch Company, has awarded the contract for machinery equipment to the Frick Company, Waynesboro, Pa. The Geo. B. Swift Company, Chicago, received the contract for the construction of the buildings.

The Landis Tool Company has decided to erect a new machine shop at its plant at Waynesboro, Pa. The building will be 80 x 100 ft.

The Syracuse Motor Car Company, Syracuse, N. Y., has awarded contract to Heffernan & Son for the construction of an automobile garage at 235 West Genesee street. The building is to be two stories, 37 x 132 ft., and will include a modern machine shop for automobile repairs.

The Barnes Gear Company, West Second street, Oswego, N. Y., manufacturer of automobile gears, has negotiations under way with the Oswego Industrial Company by which the latter agrees to construct a three-story factory building, 60 x 80 ft., and lease it to the Barnes Company for a number of years. The power will be supplied by the Industrial Company, but the machinery and equipment for the new plant will be installed by the Barnes Gear Company.

The Rose Run Iron Company, Olympia, Ky., contemplates installing a crushing plant of 200 to 300 tons daily capacity for handling iron ore.

The Minster Machine Company, Minster, Ohio, has had plans drawn for a new pattern shop.

The Washington Iron Works, Seattle, Wash., has under construction a new boiler shop, 66 x 200 ft., which will be fitted out with a full line of shearing, flanging, punching and riveting machinery, &c.

The De Laval Separator Company, Poughkeepsie, N. Y., has awarded contract to the Poughkeepsie Engineering & Contracting Company for the construction of an addition to its machine shop, 40 x 110 ft., one story. The additional space is to be used mostly for storage, and the company states that no additional machinery is to be purchased at present.

Foundries.

The Lennox Furnace Company, Marshalltown, Iowa, has completed and is now occupying a two-story brick building, 56 x 96 ft., added to its plant for the accommodation of the stove department. A new foundry now under construction is also being hurried to completion.

The Tichenor-Culver Iron Company, Oneonta, N. Y., whose foundry was recently almost destroyed by fire, has secured the Culver factory at West Oneonta, which it will remodel and will resume business there in the near future.

The Fremont Iron Foundry, Fremont, Ohio, has been incorporated, with a capitalization of \$10,000, by V. F. Tobin, F. M. Tunington and others.

The plant of the Southern Pipe & Foundry Company at North Birmingham, Ala., has been closed down for repairs.

The Decatur Furnace Company, Decatur, Ind., will build an addition to its foundry, 80 x 100 ft., in order to meet the increased demands of business.

Power Plant Equipment.

The Codd Mines Company, Goldfield, Nev., recently organized for the purpose of taking over the St. Ives Leasing Company, is contemplating the installation of a power plant and mill on East Walker River.

The Board of Education, Lead, S. D., will receive bids until June 11 for a complete steam heating and ventilating system, with central boiler plant, for the High School and Assembly Hall Building.

The George V. Fowler Realty Company, Syracuse, N. Y., with an office at 220 Broadway, New York, owner of the property at James and North State streets, Syracuse, announces that plans are under way for a 10-story apartment building, 135 x 180 ft., of steel frame fireproof construction, and in connection with the building it is proposed to install a high pressure individual power plant, electric generating plant for lighting and elevators, a refrigerating and a vacuum cleaning plants.

The New York Edison Company has taken out a permit for the erection of a three-story brick power house, 56 x 98 ft., on Twenty-sixth street, near Sixth avenue.

The Butte & Tehama Power Company, Red Bluff, Cal., has been incorporated, with a capital stock of \$1,000,000, for the purpose of installing hydro-electric power plants on Mill Creek, in Tehama County, Cal., where the company owns valuable water rights. The company is officered as follows: L. A. McIntosh, president, and Leon Bly, secretary and manager.

The American Cotton Oil Company, Guttenberg, N. J., will erect a pumping engine in its power plant to supply water for the mill.

B. F. Procter, who is installing an electric plant at El Dorado Springs, Mo., writes that he has just placed a contract for all equipment required, with the exception of a supply tank, transformers, meters and incandescent lamps.

The Illinois Central Railroad has ordered an induction motor generator set from the Bullock Electric Mfg. Company, Cincinnati, Ohio.

Jesse Knight, Provo, Utah, is installing two small hydro-electric plants, one of which will be located in the Santaquin Canyon, to supply power for a smelter in Tintic, and the other on Snake Creek, a few miles from Park City, to furnish electricity for some properties in which he is interested at that point. He has also in contemplation the installation of a plant on Weber River to furnish power to the mining industries in Park City and vicinity.

Bridges and Buildings.

A new steel bridge will be built by the Chicago, Milwaukee & St. Paul Railroad across the Wisconsin River at Sauk City, Wis.

The Wausau (Wis.) Iron Works, which was recently reported as lowest bidder for the two new steel bridges at Fond du Lac, has been awarded the contract.

The Delaware, Lackawanna & Western Railroad has awarded contract to the W. J. Burns Construction Company, Syracuse, N. Y., for the construction of a steel bridge, costing about \$50,000, to be erected over the tracks and right of way of the New York Central & Hudson River Railroad, in the seventh ward, Syracuse.

Commissioner of Public Works Francis G. Ward, Buffalo, N. Y., has been authorized by the Common Council to have plans prepared and advertise for bids for a steel bridge over the Buffalo River at Abbot road, to consist of one fixed span and one lift, or bascule span.

Albert Von Spreckelson secured the contract for a new Masonic Temple at Indianapolis, Ind., for \$229,000. The steel work was sublet to the Brown-Ketcham Iron Works of that city. The building will be fireproof and will have its own heat, light and power plant.

Fires.

Fire destroyed the main building of the Carlisle Frog & Switch Works at Carlisle, Pa., May 29. The loss is estimated by President John Hays at from \$150,000 to \$175,000. The fire was incendiary and the third to be suffered by an iron and steel plant in that town in a year.

The plant of the Green Mountain Pulp Company, Huntington, Vt., was damaged \$30,000 by fire May 30.

Miscellaneous.

The Everett-Metzger-Flanders Company, Port Huron, Mich., manufacturer of automobiles, has recently purchased and is installing \$20,000 worth of new machinery and has a force of over 200 men employed.

The Lawrence Steel Tank & Boiler Company, Marietta, Ohio, has been incorporated with a capitalization of \$10,000, by F. B. Ranger, C. S. Bunch, J. Howard Day, J. L. Peters and Andrew Dow.

The Ogdensburg Soda Pulp Company, Ogdensburg, N. Y., is receiving bids for the construction of a soda pulp mill, consisting of 16 separate buildings, which are to be erected at an estimated cost of \$750,000. The plant is to include the following detached buildings: Boiler house, steam engine building, incinerator wood preparing building, evaporator building, bleach mak-

ing building, causticizing digester building, pulp washing building, screen building, pulp bleaching building, drying building, storage buildings, and shipping room building. Construction is to be of steel and concrete.

The Davenport Locomotive Works, Davenport, Iowa, has increased its capital stock \$150,000 to \$1,250,000.

In a recent reference in these columns to the incorporation of the Century Engineering Company, Ogdensburg, N. Y., the nature of the business to be transacted was incorrectly stated. The company was incorporated to do a general engineering business, but more particularly to put on the market the Nash-Century steering engine and other marine specialties, such as the Nash-Century reel and compressor for boats locking through canals.

The Western Motor Company, Logansport, Ind., has increased its capital stock from \$250,000 to \$400,000, preparatory to building a plant at Marion, Ind. F. B. Wilkinson is president.

The Hupp Motor Company, Detroit, Mich., has had plans prepared for a factory building, 129 x 349 ft., two stories, of cement block and structural iron construction, which it will erect at Jefferson and Bellevue avenues.

The Roberts Brass Mfg. Company, Detroit, Mich., is about to commence the construction of a reinforced concrete brick and stone addition to its plant, 45 x 50 ft.

The Concrete Steel Construction Company has been incorporated at Elkhart, Ind., with \$15,000 capital stock, by Peter J. Longacker, George J. Manning and John J. Hostettler.

The Indiana Lighting Company, Lafayette, Ind., has purchased 4 acres of land at Frankfort, on which to erect a gas plant, which will supply also Lebanon, Thorntown, Crawfordsville and other adjoining cities. The main building will be 50 x 150 ft., the main gas holder to have 100,000 cu. ft. capacity. The plant will have a capacity of 300,000 cu. ft. a day. C. F. Dieterich, New York, is president, and Samuel Murdock, Lafayette, Ind., general manager.

The Ream-Diehl Marking Machine Company has been incorporated at Peru, Ind., to manufacture marking machines. The capital stock is \$25,000. The directors are Edward B. Ream, Fred S. Ream and George M. Diehl.

The Thomas W. Irwin Mfg. Company, N. S., Pittsburgh, Pa., builder of structural iron, metallic skylights and architectural sheet metal work, has received an order through Bilquist & Lee, architects, Pittsburgh, for the general sheet metal work required on the new building being erected for the Deaf and Dumb Institute at Edgewood, Pa.

Marshall Brothers, S. S., Pittsburgh, builders of freight and passenger elevators, recently shipped to the Denny Rempon Sewer Pipe Company, Seattle, Wash., two steam power elevators, and to the H. J. Heinz Company, St. Paul, Minn., one electric elevator.

Torpedo Boat Destroyer Bids Opened.

Bids for the construction of five torpedo boat destroyers authorized by the last naval appropriation bill were opened at the Navy Department, Washington, D. C., May 29. The vessels are to be of 742 tons trial displacement and will have a speed of about 30 knots. They will be equipped with turbine engines and will burn oil fuel.

The Newport News Shipbuilding & Dry Dock Company, Newport News, Va., submitted the lowest bid, which was for one destroyer at \$629,000. The other bids were: William Cramp & Sons Ship & Engine Building Company, Philadelphia, one vessel at \$637,000; Fore River Shipbuilding Company, Quincy, Mass., one vessel with machinery of the company's design at \$644,000; New York Shipbuilding Company, Camden, N. J., one vessel at \$648,000; Bath Iron Works, Bath, Maine, one vessel at \$659,500, and the Maryland Steel Company, Baltimore, one vessel at \$694,000, or two vessels at \$690,500 each.

The Bucyrus Steel Casting Company, Bucyrus, Ohio, poured last week what is said to be one of the largest steel castings ever poured by a single ladle full of metal, and the casting when taken out of the cement was found to be perfect in every respect. It is a 25-ton bed plate for a 48-in. horizontal high duty fly wheel pumping engine, and is the first bed plate cast by the company. The casting is of basic open hearth steel, 23 ft. 10 in. long, 72 in. wide and 64 in. high, with the sides only 1½ in. thick.

The Standard Brass & Copper Tube Company, New London, Conn., which will manufacture seamless brass and copper tubing, is erecting a plant to consist of a main

building, 65 x 128 ft., and a small structure, 18 x 32 ft. The corporation has organized, with William M. Parke, New York, president; Frederick J. Loomis, New London, treasurer, and Roger J. Helsler, New York, secretary.

April Iron and Steel Exports and Imports.

The values of iron and steel exports and imports in April were lower than in March, according to the report of the Bureau of Statistics of the Department of Commerce and Labor. The value of the total exports of iron and steel and manufactures thereof, not including ore, in April, was \$13,058,054, against \$13,874,461 in March. The total value of the same class of imports in April was \$2,154,430, against \$2,178,717 in March.

The exports of commodities for which quantities are given, however, show a heavy gain in weight in April, as 100,904 gross tons were exported, as compared with 94,523 tons in March, 84,860 tons in February and 70,085 tons in January. The details of the exports of these commodities for April and for the 10 months of the fiscal year ending with April are as follows:

Exports of Iron and Steel.

	April.		Ten months.	
	1909.	1908.	1909.	1908.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	2,206	5,153	37,211	43,991
Scrap.....	2,155	3,576	17,374	16,687
Bar iron.....	838	302	9,238	11,810
Wire rods.....	2,060	713	9,769	5,671
Steel bars.....	5,709	3,494	40,698	57,289
Billets, blooms, &c.....	11,857	3,819	84,776	83,479
Hoop, band, &c.....	238	331	2,944	8,115
Steel rails.....	18,246	20,352	182,521	251,668
Iron sheets and plates.....	6,599	3,050	45,624	35,692
Steel sheets and plates.....	9,733	4,191	62,281	51,307
Tin and terne plates.....	556	5,005	3,824	12,677
Structural iron and steel.....	6,346	13,744	87,011	120,791
Barb wire.....	5,506	13,610	{55,517}	134,467
Wire.....	7,172		{54,967}	
Cut nails.....	1,035	1,039	6,186	5,361
Wire nails.....	2,078	2,253	22,768	32,643
All other nails, including tacks.....	457	322	5,495	5,045
Pipes and fittings.....	18,023	12,331	106,524	150,755
Totals.....	100,904	93,285	834,728	1,027,448

* Not separately stated prior to July 1, 1908.

Pipes and fittings are again noteworthy for a decided gain in the above table, but increases are also observed in a number of other commodities, such as steel rails, billets, bars, sheets and plates.

The imports of commodities for which quantities are given totaled 17,772 gross tons in April, against 20,714 tons in March, 19,418 tons in February and 19,782 tons in January. The details of the imports of these commodities for April and for the 10 months of the fiscal year ending with April are as follows:

Imports of Iron and Steel.

	April.		Ten months.	
	1909.	1908.	1909.	1908.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	8,117	3,003	85,285	189,776
Scrap.....	245	111	4,490	17,077
Bar iron.....	755	830	13,550	31,345
Rails.....	85	417	1,286	2,626
Hoop, wire, &c.....	57	26	990	463
Billets, bars and steel in forms n.e.s.....	922	797	10,516	14,582
Sheets and plates.....	389	245	2,818	2,230
Tin and terne plates.....	5,895	6,155	40,237	48,538
Wire rods.....	914	706	9,828	11,831
Structural iron and steel.....	393	53	5,321	1,418
Totals.....	17,772	12,343	174,321	319,886

The imports of iron ore in April were 74,782 gross tons, against 108,676 tons in March and 61,749 tons in February. The total imports of iron ore for the 10 months of the fiscal year ending with April were 739,540 tons, against 863,169 tons in the corresponding period of the previous fiscal year.

The total value of the exports of iron and steel and manufactures thereof, not including ore, in the 10 months of the fiscal year ending with April were \$118,207,011, against \$161,022,823 in the corresponding period of the previous fiscal year. The imports were, respectively, \$17,733,777 and \$24,500,926.

The Iron and Metal Trades

May an Excellent Month for Orders.

The Buying Movement Abating Somewhat.

From every quarter come the reports that May was a month of heavy bookings in nearly all lines of finished iron and steel, in some instances going beyond the records of the flush times prior to the panic. Broadly speaking, the movement now shows some indications of having abated, as is only natural. The fundamental fact is that confidence is being slowly but surely restored, and that actual consumption is slowly expanding. The indifference of the iron trade in general to developments in Washington is surprising, and to some interests is alarming. The opinion generally held in the trade is that so far as the near future is involved, any effect which the passage of a tariff bill may have has been discounted.

A fair run of moderate orders have been placed in different parts of the country in pig iron, and for the present the buying movement has abated. A lot of 10,000 tons of basic was closed in Eastern Pennsylvania and some pretty good further inquiries are under consideration. The leading buyers claim to be well covered on the present basis of requirements. In the South \$11.25 for No. 2 foundry is being done for prompt shipment, and occasionally \$11 sales crop up.

Furnacemen have to a considerable extent purchased their supplies of Lake ore, occasionally at a concession of 25c. below last year's prices, and the East has bought heavily of Swedish and other ores and is taking liberal quantities of local ores. Furnace interests have also contracted quite heavily for coke, at low figures.

No additional sales of steel rails of any consequence have been effected during the past week, but in the Chicago District some heavy inquiries have appeared, among them being 72,000 tons for the Harriman lines and 15,000 tons for the Northern Pacific. The 50,000 tons required by the Gould lines has not yet been formally awarded to the Pueblo mill. The Argentine order for 49,000 tons of rails and 3500 tons of splice bars is still in abeyance.

None of the really large structural contracts which have been in the market are yet closed. At Boston the Boston & Albany grain elevator, calling for 5200 tons, has been placed. Bids have gone in on the Winner bridge, at Kansas City, which involves 13,500 tons. The bids on material for buildings are still low and the market is erratic. On bridge work a somewhat firmer tone has developed.

There is a good deal of activity in line pipe. The People's Natural Gas Company has ordered 60 to 70 miles of 14-in. pipe and the Ohio Fuel Supply Company has awarded 80 miles of 18-in. pipe, with other large orders for line pipe pending. There were rumors that an advance in merchant pipe would be announced on the 1st inst., but this was not done, and it is stated that there will not be a change for some little time.

An advance of \$2 per net ton in wire is stated to be under consideration.

The sheet trade has not thus far participated in the general betterment, and cutting is still quite prevalent. It is understood that independent sheet mills have succeeded in covering far ahead on sheet bars at low prices, and that one of them purchased a very heavy tonnage, estimated at 25,000 tons, recently.

The cast iron pipe industry is quiet. Bids have gone in on one lot of 10,000 tons for Northern New York. The opening of the bids on 8000 tons for Manila has been postponed to June 10.

Increasing strength and a higher range of prices characterize the markets for old material and for steel melting stock in particular.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

FIG IRON, Per Gross Ton: June 2, May 26, May 5, June 3, 1909. 1909. 1909. 1908.

Foundry No. 2, standard, Philadelphia	\$16.25	\$16.25	\$16.00	\$16.75
Foundry No. 2, Southern, Cincinnati	14.50	14.50	14.50	15.25
Foundry No. 2 local, Chicago...	16.50	16.50	16.50	17.60
Basic, delivered, Eastern Pa...	15.50	15.50	15.00	16.00
Basic, Valley furnace.....	14.25	14.25	14.00	15.25
Bessemer, Pittsburgh.....	15.90	15.90	15.65	16.90
Gray forge, Pittsburgh.....	14.65	14.40	14.40	14.90
Lake Superior Charcoal, Chicago	19.50	19.50	19.50	20.00

BILLETS, &c., Per Gross Ton:

Steel billets, Pittsburgh.....	23.00	23.00	23.00	28.00
Forging billets, Pittsburgh.....	25.00	25.00	25.00	30.00
Open hearth billets, Philadelphia	24.50	24.50	24.50	29.20
Wire rods, Pittsburgh.....	29.00	29.00	29.00	35.00
Steel rails, heavy, at mill.....	28.00	28.00	28.00	28.00

OLD MATERIAL, Per Gross Ton:

Steel rails, melting, Chicago....	14.75	14.25	14.00	12.25
Steel rails, melting, Philadelphia	15.50	15.25	14.00	13.00
Iron rails, Chicago.....	17.00	17.00	16.50	15.50
Iron rails, Philadelphia.....	18.50	18.50	17.00	18.00
Car wheels, Chicago.....	15.25	15.00	14.75	13.00
Car wheels, Philadelphia.....	15.00	15.00	14.50	14.00
Heavy steel scrap, Pittsburgh....	15.75	15.50	14.25	13.00
Heavy steel scrap, Chicago.....	14.50	14.00	13.00	11.50
Heavy steel scrap, Philadelphia.	15.50	15.25	13.75	13.00

FINISHED IRON AND STEEL,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined iron bars, Philadelphia..	1.40	1.40	1.35	1.40
Common iron bars, Chicago....	1.30	1.30	1.25	1.58
Common iron bars, Pittsburgh...	1.30	1.30	1.30	1.50
Steel bars, tidewater, New York	1.36	1.36	1.31	1.76
Steel bars, Pittsburgh.....	1.20✓	1.20	1.15	1.60
Tank plates, tidewater, New York	1.41	1.46	1.41	1.86
Tank plates, Pittsburgh.....	1.25✓	1.30	1.25	1.70
Beams, tidewater, New York....	1.41	1.46	1.41	1.86
Beams, Pittsburgh.....	1.25	1.30	1.25	1.70
Angles, tidewater, New York...	1.41	1.46	1.41	1.86
Angles, Pittsburgh.....	1.25✓	1.30	1.25	1.70
Skelp, grooved steel, Pittsburgh.	1.30	1.30	1.20	1.55
Skelp, sheared steel, Pittsburgh.	1.40	1.40	1.30	1.65

SHEETS, NAILS AND WIRE,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20✓	2.20	2.20	2.50
Wire nails, Pittsburgh.....	1.70	1.70	1.60	2.05
Cut nails, Pittsburgh.....	1.65	1.65	1.65	1.85
Barb wire, galv., Pittsburgh....	2.00	2.00	1.90	2.50

METALS, Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	13.50	13.50	12.87½	13.00
Electrolytic copper, New York...	13.25	13.25	12.62½	12.62½
Spelter, New York.....	5.20	5.20	5.02½	4.55
Spelter, St. Louis.....	5.05	5.05	4.90	4.40
Lead, New York.....	4.35	4.40	4.22½	4.30
Lead, St. Louis.....	4.25	4.30	4.10	4.20
Tin, New York.....	29.10	29.15	29.10	28.85
Antimony, Hallett, New York...	7.75	7.75	7.75	8.50
Nickel, New York.....	45.00	45.00	45.00	45.00
Tin plate, 100 lb., New York...	\$3.64	\$3.64	\$3.64	\$3.89

Prices of Finished Iron and Steel F.O.B. Pittsburgh.

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural steels and sheets, No. 11 and heavier, 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Structural Shapes.—I-beams and channels, 3 to 15 in., inclusive, 1.25c. to 1.30c., net; I-beams over 15 in., 1.35c., net; H-beams over 8 in., 1.45c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.30c., net; angles, over 6 in., 1.35c., net; angles, 3 x 3 in. and up, less than ¼ in., 1.45c., base, half extras, steel bar card; tees, 3 in. and up, 1.30c., net; tees, 3 in. and up, 1.30c., net; angles, channels and tees, under 3 in., 1.20c., base, plus 10c. half extras, steel bar card; deck beams and bulb angles, 1.60c., net; hand rail tees, 2.70c., net; checkered and corrugated plates, 2.70c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.25c. to 1.30c., base. Extras over this price, are as follows:

Tank, ship and bridge quality, ¼-in. thick on edges, 100 in. wide, down to but not including 6 in. wide, is taken as base.

Steel plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, shall be considered $\frac{1}{4}$ -in. plate. Steel plates over 72 in. wide must be ordered $\frac{1}{4}$ -in. thick on edge, or not less than 11 lb. per square foot, to take base price. Steel plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. shall take the place of 3-16-in.

Percentages as to overweight on plates, whether ordered to gauge or weight, to be governed by the Association of American Steel Manufacturers' Standard Specifications

Gauges under $\frac{1}{4}$ -in. to and including 3-16-in. plates on thin edges.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
All sketches (excepting straight taper plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.).....	.10
Complete circles.....	.20
Boiler and flange steel plates.....	.10
"A. B. M. A." and ordinary firebox steel plates.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Shell grade of steel is abandoned.	
For widths over 100 in. up to 110 in.....	.05
For widths over 110 in. up to 115 in.....	.10
For widths over 115 in. up to 120 in.....	.15
For widths over 120 in. up to 125 in.....	.25
For widths over 125 in. up to 130 in.....	.50
For widths over 130 in.....	1.00

TERMS.—Net cash 30 days. Pacific Coast base, 1.30c. f.o.b. Pittsburgh.

Sheets.—Minimum prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Blue annealed sheets, No. 10 and heavier, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 2.05c.; Box annealed sheets, Nos. 17 to 21, 2c.; Nos. 22 to 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Galvanized sheets, Nos. 13 and 14, 2.25c.; Nos. 15 and 16, 2.35c.; Nos. 17 to 21, 2.50c.; Nos. 22 to 24, 2.65c.; Nos. 25 and 26, 2.85c.; No. 27, 3.05c.; No. 28, 3.25c.; No. 29, 3.25c.; No. 30, 3.60c. Painted roofing sheets, No. 28, 1.55c. per square. Galvanized roofing sheets, No. 28, 2.80c. per square for $2\frac{1}{2}$ -in. corrugations.

Wrought Pipe.—Discounts on steel pipe, $\frac{3}{4}$ to 6 in., in carloads to the largest trade, are 81 and 5 per cent. off list, and on iron pipe, $4\frac{1}{2}$ to 8 in., are 78 and 5 per cent. off list.

Boiler Tubes.—Regular discounts are as follows:

Boiler Tubes.		Steel.
1 to $1\frac{1}{2}$ in.....		.50
$1\frac{1}{2}$ to $2\frac{1}{4}$ in.....		.62
$2\frac{1}{4}$ to 5 in.....		.70
$2\frac{1}{2}$ in.....		.64
6 to 18 in.....		.62
$2\frac{1}{2}$ in. and smaller, over 18 ft. long, 10 per cent. net extra.		
$2\frac{1}{2}$ in. and larger, over 22 ft. long, 10 per cent. net extra.		

Wire Rods.—Bessemer rods, \$29; chain rods, \$29; basic rods, \$29 to \$30.

Chicago.

FISHER BUILDING, June 2, 1909.—(By Telegraph.)

Fortified by the flood of orders for bars, plates and shapes that has been pouring in to the mills for the past month, finishing departments are generally occupied at full capacity. Something of the volume of the business developed in this period may be realized when it is stated that, including rails, 300,000 tons were entered last month by the Illinois Steel Company. This eclipses all previous records for the past two years. It should be noted also that, with the exception of 5000 tons, none of the bookings runs beyond October, and most of them are for as prompt shipment as can be given. Specifications for plates and shapes are accumulating faster than the mills are able to turn them out, and deliveries on these products are beginning to lag. The only finishing department of the Illinois Steel Company not running under full capacity is that of the rail mills, but the demands upon these will soon compel a quickening of their gait. The bar iron mills have not as yet shared to any great extent in the general improvement. Steel scrap is scarce and prices have been still further advanced by buying for outside markets. Fabricating shops are gradually filling up with work, and better prices are being realized on current contracts than were possible a month ago. The wire and wire nail mills have orders on hand sufficient to keep them fully employed for the next 60 or 90 days at least. Foundry pig iron seems to have been little affected as yet by the general industrial improvement observed in the demand for finished materials. Underlying the permanence of the whole progressive movement now so strongly in evidence is the continued growth of consumption at a corresponding rate, and this in turn is to a large extent dependent upon prospective crop conditions, which up to the present time are, fortunately, favorable.

Pig Iron.—The pig iron market shows little signs of activity so far as new business is concerned. Most of the sales comprising transactions of the past week were of small lots, and inquiries for tonnage of important size are scarce. One concern is asking prices on 1000 tons of foundry iron and another on a few hundred tons of high silicon iron. A lot of 1000 tons of off grade Northern iron was placed by a Milwaukee manufacturer. The malleable melters are more

conspicuous as buyers than for some time, but at that their requirements are further below normal than other melters except among the implement makers. Southern furnaces are holding firm at \$11.50, Birmingham, for last half, but some recent sales have been made at \$11.25 for prompt shipment; this price, however, seems to be available from only a few sources. As indicative of the rate of consumption, it is stated that contract shipments are moving with little interruption, there being but few holdup orders from purchasers. At the same time the melt is not increasing rapidly in any direction. The following prices are for June delivery, f.o.b. Chicago:

Lake Superior charcoal.....	\$19.50 to \$20.00
Northern coke foundry, No. 1.....	17.00 to 17.50
Northern coke foundry, No. 2.....	16.50 to 17.00
Northern coke foundry, No. 3.....	16.00 to 16.50
Northern Scotch, No. 1.....	17.50 to 18.00
Southern coke, No. 1.....	16.35 to 16.85
Southern coke, No. 2.....	15.85 to 16.35
Southern coke, No. 3.....	15.35 to 15.85
Southern coke, No. 4.....	14.85 to 15.35
Southern coke, No. 1 soft.....	16.35 to 16.85
Southern coke, No. 2 soft.....	15.85 to 16.35
Southern gray forge.....	14.35 to 14.85
Southern mottled.....	14.10 to 14.60
Malleable Bessemer.....	16.50 to 17.00
Standard Bessemer.....	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6 %.....	19.90 to 20.40
Jackson Co. and Kentucky silvery, 8 %.....	20.90 to 21.40
Jackson Co. and Kentucky silvery, 10 %.....	21.90 to 22.40

Billets and Rods.—While no large sales are reported, the general demand for forging billets from machinery builders indicates a gradual increase in requirements. Few of the leading mills have any surplus tonnage of steel above what is needed for their own finishing departments, and in consequence prices have firmed up. We are advised that the minimum now obtainable from any source is \$26, and one sale of forging billets is reported at \$1 above this price. The leading makers of wire rods are booking little new business, but specifications against existing contracts are freely offered.

Rails and Track Supplies.—After a period of hesitation following the recent advance in light rails, buyers are beginning to come into the market at the new prices. Several good sized orders were secured last week by the Illinois Steel Company, whose light rail mill at the South Works is running fuller than for some time. The continued advance of old steel rerolling rails has helped to steady the light rail market, since it has limited the margin of profit for the rerolling mills. While no new orders for standard section rails are reported for the past week, inquiries now in the market foreshadow the early placing of nearly 100,000 tons. The bulk of this prospective tonnage is comprised of two lots—one from the Harriman lines of 72,000 tons and one from the Northern Pacific of 15,000 tons. Practically all of the rail orders thus far placed are wanted for as early delivery as is practicable for the mills to make. No. 2 rail mill at the South Works, rolling standard sections, is not yet gaited up to full capacity, but its output is steadily being increased. Regular prices of light rails, which, it is stated, are more firmly maintained than at any time in months past, are as follows: 40 to 45 lb. sections, \$26; 30 to 35 lb. sections, \$26.75; 16, 20 and 25 lb. sections, \$27; 12-lb. sections, \$28. Chicago, less 50c. a ton on lots under 500 tons and \$1 a ton on lots over 500 tons.

Structural Material.—It is estimated that the total of fabricating contracts let last month is 250,000 tons. The transactions of last week were individually unimportant, but there is still a large amount of business in sight that is certain to be placed, besides a still greater tonnage under consideration that is more or less indefinite. There are bids outstanding on 50,000 tons of fabricated work, and double this tonnage is involved in plans now on the boards. The 1500 tons required for the Brandeis Theatre and office building, Denver, Colo., was secured by the Thompson-Starrett Company, and 3000 tons for the Utah Hotel, Salt Lake City, was taken by the American Bridge Company. Bids are in on the Winner bridge, Kansas City, calling for 13,500 tons; also on the Peoria & Pekin Union drawbridge for around 1400 tons. The demand for shipment of plain material is growing urgent, and deliveries are beginning to lag. For the first time in a year and a half the American Bridge Company has received notice from the Carnegie Steel Company that its orders for 12 and 14 in. beams must, on account of crowded capacity, go over into the next rolling schedule. From the way specifications are coming in the difficulty of obtaining prompt shipments is likely to become more pronounced instead of diminishing. The range of bids now current on fabricated work indicates a level of prices anywhere from \$3 to \$5 a ton above the extreme low limits reached. Plain material prices are firm, at 1.30c., Pittsburgh, or 1.48c., Chicago, except that on shipments from local mills 1.45c., Chicago, is occasionally done. Specifications with orders are being insisted upon by the mills, none of which is contracting ahead at these prices, except for tonnage required for specific jobs.

Plates.—The plate mills are being operated at practically full capacity, and tonnage in both new orders and specifications is growing. The car shops, although not contributing their full quota, are nevertheless more of a factor in the

situation than for some time. The boiler shops also are buying and specifying much more liberally. Under these supporting influences prices are more evenly maintained at 1.30c., Pittsburgh. The only deviation from this figure is a possible allowance of 3 cents below the regular Pittsburgh freight rate on shipments from local mills.

Sheets.—The demand from all sources is steadily though not rapidly increasing. There is still some capacity to be filled before all the mills are fully occupied. Prices are still susceptible of some shading, although the tendency is toward more regular maintenance of the regular recognized schedule as quoted under "f.o.b. Pittsburgh" prices.

Bars.—In spite of the heavier tonnage placed in early contracts, there is still a fair amount of new orders being entered for steel bars. Over 40,000 tons were booked by the Illinois Steel Company during the month of May, and the independent mills have also secured tonnage of satisfactory proportions. The Cambria Steel Company and the Republic Iron & Steel Company have advanced prices \$1 a ton and are now holding at 1.25c., Pittsburgh. The Illinois Steel Company and Carnegie Steel Company are still selling at 1.20c., Pittsburgh, and in many cases the former interest is not conceding anything from the regular 18c. freight differential on this basis. The Bay View mills of the Illinois Steel Company are operating at full capacity both on bars and shapes. The Illinois Central Railroad is reported to have purchased 900 tons of bar iron at a price under 1.30c., Chicago, for early delivery. Notwithstanding the continued advance in scrap, bar iron prices have not stiffened up correspondingly. The mills are generally asking 1.30c. on current business, but this can be slightly shaded on desirable specifications.

Merchant Pipe.—The demand for merchant pipe continues to improve, but at a slow rate as compared with other rolling mill products. Rumors of an impending advance are discredited by the leading interests as forecasting any immediate action likely to be taken in this direction. Whatever increase there is in the volume of business is apparently due to greater consumption than to heavier buying by jobbers in anticipation of future demand.

Boiler Tubes.—There is, perhaps, a little better demand for merchant tubes from the boiler shops, but trade, as a whole, is pretty closely limited to small orders for current needs. Regular discounts are subject to some shading, especially on locomotive tubes, which are likewise inactive.

Merchant Steel.—With but few exceptions the implement makers have placed contracts for their requirements in miscellaneous shapes a year ahead from July 1. Ordinarily, these interests do not begin to specify material for fall work until the latter part of July or August 1. The mills, however, are urging that specifications be furnished as fast as possible from now on, in order to avoid delay from congestion later on. Some are responding with specifications, but the disposition to wait until crop prospects are more fully outlined retards general action along this line. The Cambria Steel Company has advanced prices on merchant steel and special shapes \$1 a ton.

Metals.—Copper has lost none of the gain made in the past two or three weeks either in price or demand. There has been no exceptionally heavy buying within that time, but there has been enough doing to indicate a healthy expansion in actual consumption. Both lead and spelter are more active, and prices are slightly higher. Quotations are as follows: Casting copper, 13 $\frac{1}{4}$ c. to 13 $\frac{3}{4}$ c.; lake, 13 $\frac{1}{2}$ c. to 13 $\frac{3}{4}$ c., in car lots, for prompt shipment; small lots, $\frac{1}{4}$ c. to $\frac{9}{16}$ c. higher; pig tin, car lots, 31c.; small lots, 33c.; lead, desilverized, 4.50c. to 4.60c., for 50-ton lots; corroding, 4.75c. to 4.85c., for 50-ton lots; in car lots, 2 $\frac{1}{4}$ c. per 100 lb. higher, spelter, 5.30c. to 5.40c.; Cookson's antimony, 10 $\frac{1}{2}$ c., and other grades, 9 $\frac{1}{4}$ c. to 10 $\frac{1}{4}$ c.; sheet zinc is \$6.75, f.o.b. La Salle, in car lots of 600-lb. casks. On old metals we quote: Copper wire, crucible shapes, 13 $\frac{1}{4}$ c.; copper bottoms, 11 $\frac{1}{2}$ c.; copper clips, 12c.; red brass, 11 $\frac{1}{4}$ c.; yellow brass, 9 $\frac{1}{2}$ c.; light brass, 7c.; lead pipe, 4 $\frac{1}{4}$ c.; zinc, 4.75c.; pewter, No. 1, 21c.; tin foil, 23c.; block tin pipe, 26c.

Cast Iron Pipe.—Among the small municipal lettings in prospect are 300 tons for St. Edward, Neb., and 200 tons for Clovis, N. M., bids on which will be opened June 11 and 16, respectively. No heavy tonnage was included in the week's closures, all of which so far as reported were for small lots ranging from 100 to 400 tons. The pipe laying season is now opening up all over the country, and as a result a livelier demand for extension requirements is looked for. We quote per net ton, Chicago, as follows: Water pipe, 4 in., \$27.50; 6 to 12 in., \$28.50; 16 in. and up, \$25.50, with \$1 extra for gas pipe.

Old Material.—Purchases of steel scrap made last week for shipment to mills in the Pittsburgh District had the effect of forcing old material prices still higher. While the demand centered almost wholly on melting steel, other grades were sympathetically affected, and, with the exception of foundry scrap, nearly all grades advanced 50c. or more a ton. None of the important local consumers is buying heavily at the present level, and it is believed that most of

them have their present requirements pretty well covered by former purchases. That steel scrap is relatively scarce has, however, been shown by the small amount that has come out in response to the prices now prevailing. In view of the large increase of open hearth capacity and the recent expansion of mill activity calling a greater proportion of it into service, the demand for steel scrap has naturally been stimulated. Recent offerings of railroad material, which as a rule have been divided into small lots, have been disposed of at top prices; \$19 per net ton for iron car axles and \$14 per net ton for No. 1 wrought are reported to have been paid for car lots sold last week. A list of 1600 tons from the Santa Fe, containing 665 tons of old car wheels, and one of even larger tonnage from the Chicago & Northwestern, with 500 tons of wrought scrap, are to be closed this week. A lot of about 300 tons of old car wheels sold last week by a Western road brought \$15.35 per gross ton. The following prices are per gross ton, f.o.b. Chicago:

Old iron rails.....	\$17.00 to \$17.50
Old steel rails, rerolling.....	15.50 to 16.00
Old steel rails, less than 3 ft.....	14.75 to 15.25
Relaying rails, standard sections, subject to inspection.....	22.50 to 23.50
Old car wheels.....	15.25 to 15.75
Heavy melting steel scrap.....	14.50 to 15.00
Frogs, switches and guards, cut apart.....	14.50 to 15.00
Mixed steel.....	11.50 to 12.00

The following quotations are per net ton:

Iron fish plates.....	\$17.25 to \$17.75
Iron car axles.....	18.75 to 19.25
Steel car axles.....	17.75 to 18.25
No. 1 railroad wrought.....	13.50 to 14.00
No. 2 railroad wrought.....	12.50 to 13.00
Springs, knuckles and couplers.....	13.50 to 14.00
Locomotive tires, smooth.....	14.50 to 15.00
No. 1 dealers' forge.....	10.00 to 11.00
Mixed bushing.....	8.50 to 9.00
Steel axle turnings.....	8.50 to 9.00
Machine shop turnings.....	7.50 to 7.75
Cast borings.....	6.00 to 6.50
Mixed borings, &c.....	5.50 to 6.00
No. 1 mill.....	7.00 to 7.50
No. 2 mill.....	6.00 to 6.50
No. 1 boilers, cut to sheets and rings.....	10.00 to 10.50
No. 1 cast scrap.....	14.00 to 14.50
Stove plate and light cast scrap.....	11.75 to 12.25
Railroad malleable.....	12.75 to 13.25
Agricultural malleable.....	11.25 to 11.75
Pipes and flues.....	10.25 to 10.75

Birmingham.

BIRMINGHAM, ALA., May 31, 1909.

Pig Iron.—A summary of conditions existing at the close of the past week indicates a stronger market. The producing interests who have been disposed to depart from the established schedule of asking prices in order to move their daily output are less solicitous for orders, and that their prices are firmer is indicated by the manner in which recent engagements for early requirement have been distributed. The concern to which the majority of sales at a concession is accredited now announces a limited tonnage to offer for delivery during the remainder of the first half, with the third quarter output practically disposed of. This interest quotes \$12, Birmingham, on a No. 2 foundry basis for strictly last quarter shipments; but, as in the case of smaller concerns that have adopted that price, reports no sales at the figures asked. The market for deliveries covering the remainder of the year is understood to be correctly represented by the \$11.50, Birmingham, schedule, although, by reason of preference in brands, engagements of melters are not in all cases as liberal as they would be under other conditions. There is a tendency on the part of all producers to lessen the differential in quotations on low grades and the premium is usually paid by the trade. The principal sale of low grades during the week was 1500 tons of gray forge for delivery at the rate of 500 tons per month, commencing immediately. The price considered in this transaction was \$10.50, Birmingham. A cash transaction, involving 1000 tons of No. 2 foundry at \$11.50, Birmingham, is reported, and negotiations on a lot of 5000 to 7500 tons for forward delivery have just been closed. It is understood that the rate of production is to be reduced by the blowing out of one stack the coming week, and there are probably only two additional available stacks for operation on foundry grades within the next 60 or 90 days.

Cast Iron Pipe.—The demand just at this time for cast iron pipe is rather desultory, but the aggregate of small orders placed from time to time is attractive and producers are optimistic as to the future. As an evidence of the prospects, preparations are now being made for the resumption of operations at the only plant in this district remaining idle. The plants in operation are in all cases well supplied with orders, and accumulations are found only where certain sizes have of necessity been manufactured. An additional shipment of Universal water pipe is to be made to an Arizona point within the coming week, which will make an aggregate of some 100 cars furnished that particular locality. We quote water pipe as follows, per net ton, f.o.b. cars here: 4 in. to 6 in., \$25; 8 in. to 12 in., \$24; over 12 in., \$22 to \$23, with \$1 per ton extra for gas pipe. These quotations are probably shaded on large municipal contracts.

Old Material.—Owing to the demand for low grade pig iron, dealers have found a more ready market for light cast and stove plate and have accordingly advanced quotations. There is considerable more inquiry for steel scrap and the outlook for old rails and car wheels is more encouraging. Dealers' asking prices, which are in the main nominal, are revised as follows, per gross ton, f.o.b. cars here:

Old iron rails.....	\$13.50 to \$14.00
Old iron axles.....	14.50 to 15.00
Old steel axles.....	12.00 to 12.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	10.00 to 10.50
No. 1 country wrought.....	9.00 to 9.50
No. 2 country wrought.....	8.50 to 9.00
No. 1 machinery cast.....	10.50 to 11.00
Tram car wheels.....	10.50 to 11.00
Standard car wheels.....	12.00 to 12.50
Stove plate and light cast.....	8.50 to 9.00
Cast borings.....	4.00 to 4.50

Philadelphia.

PHILADELPHIA, PA., June 1, 1909.

While a fair volume of business continues to be transacted, both in crude and finished materials, there has not been the same heavy buying that recently characterized the market. The larger consumers have pretty well covered for their needs for the third quarter, and in some instances for the entire second half of the year, but there has been enough business of a moderate character to maintain fully the strength of the market. Higher prices are named for pig iron, but they have not yet been realized; some producers have also advanced their price for steel bars, but from others they can still be had at the old quotations. The general demand for iron and steel products is better than it was; mills are more fully engaged, and in some instances have booked a better aggregate in the past month than in any month since the panic of 1907. The measure of improvement has not been rapid, but slow and steady. The railroads appear to be ordering equipment somewhat more freely, the local locomotive builder taking during the week one order for 105 locomotives, the largest single order taken for a long time.

Pig Iron.—The only important purchase of basic iron during the week was a lot of 10,000 tons for shipment in the fourth quarter, at \$15.50, delivered, at which price sellers are firm for third and fourth quarter shipment. Several steelmakers have covered for the major portion of their requirements during the last half, and the principal buyers have temporarily withdrawn from the market. Few large purchases of foundry irons have been reported. The more important buyers of those grades, who have been quite heavy purchasers recently, have suspended further buying for the time. There has, however, been quite a large volume of miscellaneous business running from carloads up, which in the aggregate amount to a very satisfactory tonnage, and some producers are now pretty well sold up on deliveries during the third quarter and are not willing to take orders at the present range of prices for more extended delivery. Prices are stiffer, and while \$16.25, delivered, has been done for No. 2 X foundry for prompt shipment, iron at this price is becoming scarce. For strictly third quarter delivery standard brands of this grade command \$16.50, delivered, while an advance of 25c. is asked by some sellers for third quarter and 50c. for fourth quarter shipment. Virginia foundry iron has been in fair demand, but the bulk of the sales have been small, and prices, while no higher, are being quite firmly maintained. Southern iron has not been active, although one sale of 3000 tons of low grade iron has been made to one of the Delaware River pipe foundries at \$15, delivered. On the higher grades transactions have been light and prices are reported firm. Forge iron has not been in active demand. There have been some inquiries, but prices asked by sellers are higher than buyers' ideas, and no tonnage of importance has been taken. Low phosphorus iron has been a trifle more active, at unchanged prices. One lot of 1000 tons, for Western shipment, was sold at a price equal to \$19.50, delivered in this vicinity, while some small sales were made on a basis of \$20, delivered. The general situation is strong, and while a rather quiet market for pig iron is anticipated for the next few weeks, it is believed that there will be fully enough business to sustain the market. Higher prices, it is believed, will, to a certain extent, check buying, unless there should be a more pronounced volume of business in finished and semifinished products. There is a disposition on the part of sellers, however, to advance prices 25c. to 50c. a ton, dependent on delivery. For prompt shipment business has been transacted at the following range of prices, delivered in buyers' yards, eastern Pennsylvania and nearby points:

Eastern Pennsylvania, No. 2 X foundry.....	\$16.25 to \$16.50
Eastern Pennsylvania, No. 2 plain.....	15.75 to 16.00
Virginia, No. 2 X foundry.....	16.50 to 16.75
Virginia, No. 2 plain.....	16.25 to 16.50
Gray forge.....	15.00 to 15.25
Basic.....	15.50
Low phosphorus.....	19.50 to 20.00

Ferromanganese.—The demand shows an improvement and sales of lots ranging from 300 to 500 tons, for delivery

extending over the last half of the year, are reported at \$41, Baltimore. Some of the larger buyers would contract for deliveries extending into next year if sellers would accept the business at the present range of prices, but this they refuse to do. Several inquiries for moderate lots are before the trade.

Billets.—The situation is unsatisfactory; sellers will not accept forward business at the ruling prices, and what is transacted is almost entirely of a prompt nature. Ordinary billets command \$24.50 to \$25, delivered in this territory, forging steel taking the usual \$2 advance.

Plates.—Several mills report a moderate improvement in orders and tonnage. The aggregate for the month is better, and one producer reports May as the best month since the 1907 panic. The demand shows a wider range, and while no large individual tonnage has been taken, there has been a good volume of moderate sized orders. Prices are being fairly well maintained at 1.45c. to 1.55c., delivered in this territory.

Structural Material.—Few contracts of any size have developed. The Philadelphia & Reading Railway will require 3500 tons of bridge material, under contract No. 11, for further extension of its Ninth street elevated work. Several small building propositions have come out, but no large lots have been placed. General business continues of a satisfactory volume. Prices of plain material are well maintained, while fabricated work shows a tendency toward higher figures. Plain material continues to be quoted for delivery in this territory at 1.45c. to 1.55c., according to specification.

Sheets.—While the demand is fairly active, the situation shows some indications of weakness, it being understood that a tendency to make concessions for tonnage had again developed. Mills continue fairly active, but business develops unsatisfactorily and is largely for prompt shipment, at prices ranging about as follows, for delivery in this territory: Nos. 18 to 20, 2.40c.; Nos. 22 to 24, 2.50c.; Nos. 25 and 26, 2.60c.; No. 27, 2.70c.; No. 28, 2.80c.

Bars.—The situation is a trifle stronger; there is a shade better demand and sellers are less disposed to accept orders for forward delivery at the present range of quotations, which show a hardening tendency, owing to the advancing prices of crude materials. Steel bars have in some instances been marked up \$1 a ton, but are still to be freely had at the old quotation, 1.35c., delivered in this territory. Refined iron bars command from 1.40c. to 1.50c., and common iron bars 1.35c. to 1.40c., delivered, in this district.

Coke.—There has been a better movement in furnace coke, some fairly heavy contracts for delivery during the last half at slightly higher prices being noted. Foundry coke is a shade more active and prices are firmer. For delivery over the last half of the year furnace coke is quoted at \$1.65 to \$1.75, at oven; foundry coke is quoted \$2.15 to \$2.25, at oven. For delivery in this territory prices range about as follows.

Connellsville furnace coke.....	\$3.90 to \$4.10
Foundry coke.....	4.35 to 4.50
Mountain furnace coke.....	3.50 to 3.70
Foundry coke.....	3.80 to 4.10

Old Material.—A moderate movement is to be noted in the leading grades. Several fair sized lots of heavy melting steel have been sold at \$15.50, delivered, and prices are stronger. Rolling mills are aggressive buyers of some classes of material, and the market still shows an upward tendency. A wider range of prices is to be noted for some classes of scrap, owing to the anxiety of some mills to get stock. Stove plate, which has been fairly active, shows an advance of fully \$1 a ton, while some buyers refuse to pay over \$11.75, others have paid \$12.75, delivered, for that grade. Prices, while to some extent still nominal, range about as follows for delivery in buyers' yards, eastern Pennsylvania and nearby points:

No. 1 steel scrap and crops.....	\$15.50 to \$16.00
Low phosphorus.....	19.50 to 20.50
Old steel axles.....	20.50 to 21.50
Old iron axles.....	22.00 to 23.00
Old iron rails.....	18.50 to 19.50
Old car wheels.....	15.00 to 15.50
Choice No. 1 R. R. wrought.....	18.50 to 19.00
Machinery cast.....	15.00 to 15.50
Railroad malleable.....	14.00 to 14.50
Wrought iron pipe.....	15.50 to 16.00
No. 1 forge fire scrap.....	13.00 to 13.50
No. 2 light iron.....	9.00 to 9.50
Wrought turnings.....	12.50 to 13.00
Stove plate.....	11.75 to 12.75
Cast borings.....	10.50 to 11.00
Grate bars.....	13.50 to 14.00

Considerable interest has been aroused in Pittsburgh, Pa., by the application for charters for two underground railroads to construct tunnels under the business district. Part of their routes conflict and this week the applications will be passed upon by State officials at Harrisburg. M. M. Garland and F. T. F. Lovejoy are interested in one of the companies.

Pittsburgh.

PARK BUILDING, June 2, 1909.—(By Telegraph.)

Pig Iron.—Sentimentally, at least, the pig iron market is better and prices are hardening. A local interest is in the market for a round tonnage of basic for delivery over the last half and another local consumer will likely close today for 1000 tons of basic for shipment over the second and third quarters. Prices are firmer than for some time, and we quote sand cast Bessemer iron at \$15 to \$15.25; malleable Bessemer, \$14.50 to \$14.75; basic, in small lots for spot shipment, \$14.25, and for delivery over third and fourth quarters, \$14.50; No. 2 foundry, \$14.50 to \$14.75, and gray forge, \$13.75, all at Valley furnace, the freight rate to Pittsburgh being 90 cents a ton. We note a sale of 1000 tons of basic for June and July delivery at \$14.35 and 200 tons of prompt basic at \$14.40, Valley furnace.

Steel.—Specifications on contracts for billets and sheet and tin bars continue to come in very freely, and shipments of steel by the mills in May were much heavier than for some months. A sale of 1500 tons of sheet bars was made for delivery over the next two or three months at \$24, delivered, in the Pittsburgh District. We quote Bessemer billets at \$23, forging billets at \$25 and sheet and tin bars at \$24 to \$25, f.o.b. Pittsburgh.

Spikes.—The New York Central has placed an order with a local interest for 15,000 kegs of spikes for delivery over the next two or three months.

(By Mail.)

Reports of operations by the leading steel interests for the month of May are decidedly encouraging and strongly reflect the great improvement that has come in the steel trade, and which promises to continue. The Carnegie Steel Company in its rail and billet division gained 23,000 tons in orders sent to the mills in May over April, while the structural and plate division showed an increase in actual orders in May over April more than double, and an increase in specifications of more than 50 per cent. The actual orders and specifications entered by the Republic Iron & Steel Company in May were much the largest in any one month for nearly two years, and this company is now filled up on practically everything it makes for the next five or six weeks. The Jones & Laughlin Steel Company had a very heavy month in May—much larger than in April—and is also sold up on most of its products well toward the close of the year. The Youngstown Sheet & Tube Company entered more actual orders and specifications in May than in any previous month in the history of the company and is running all departments of its immense plant to practically full capacity. Indications for the future are regarded as bright, and already on some lines, especially structural steel and steel bars, two or three of the mills are not making deliveries that are entirely satisfactory to customers. The Carnegie Steel Company is now operating all of its steel plants practically full, except the North Sharon, Pa., and the Columbus, Ohio, works. The Riverside department of the National Tube Company, at Wheeling, W. Va., which has been idle upward of two years, will be put on this week. The one item in the whole list that is not satisfactory is standard rails, but a buying movement in rails has started in the West. The wire business is in splendid shape, and the American Steel & Wire Company operated its plants on May 31, Decoration Day, owing to the great rush of orders on its books. There is quite a heavy movement in the scrap trade and prices have advanced sharply, with the available supply of certain lines of scrap very limited. The whole situation looks good, and while there may be some let-down in the hot months of July and August, it is believed the last three or four months of the year will be active.

Ferromanganese.—This material does not show any improvement in prices, which are rather weak, the demand being limited. We quote 80 per cent. foreign ferro at \$40.50 to \$41, seaboard, the freight rate to Pittsburgh being \$1.95 a ton.

Ferrosilicon.—The supply of this material for prompt shipment seems to be a little better, and prices are not as high as they were. We quote 50 per cent. at \$61 to \$62 for prompt shipment, and note that all material for shipment after June 10 is being sold with duty on account of the buyer.

Rods.—Consumers of rods who covered their requirements for some time ahead, when prices were \$27 or lower, are specifying freely against these contracts, and shipments of rods by the mills are heavy. We quote Bessemer, open hearth and chain rods at \$29, Pittsburgh.

Skelp.—Mills rolling iron and steel skelp are busier than for some time, and some new orders are being placed. One local mill that makes a specialty of rolling sheared iron plates is pretty well filled up for the next two or three months. We quote grooved steel skelp at 1.30c. to 1.35c.;

sheared, 1.40c. to 1.45c.; grooved iron, 1.50c. to 1.55c., and sheared iron skelp, 1.55c. to 1.60c., all for ordinary widths and gauges, f.o.b. Pittsburgh.

Steel Rails.—There is no improvement in the local situation in standard rails, but orders and specifications for light rails are good, the Carnegie Steel Company having entered 2821 tons in the past week. A buying movement in rails has started in the West, and it is hoped that some of the Eastern roads will be in the market before long with at least modest requirements for this year's delivery. We quote standard sections at \$28, at mill, while prices on light rails are as follows: 12-lb., \$28; 16, 20 and 25 lb., \$27; 30 and 35 lb., \$26.75; 40 and 45 lb., \$26, all in 250-ton lots, f.o.b. Pittsburgh. Over 250 tons and up to 500 tons, 60c. a ton less, and over 500 tons \$1 a ton less. Splice bars are 1.50c., at mill, and the demand is good.

Plates.—There has been some more buying of cars, and reports are that several large contracts for steel cars and steel underframe cars will soon be placed. The Chesapeake & Ohio has bought 500 additional steel hopper cars of 100,000 lb. capacity of the Standard Steel Car Company for July delivery, and the Jersey Central is in the market for 1500 cars, which will likely go to the same interest. The plates and shapes for these cars will be rolled by the Carnegie Steel Company. There are also some large pipe line projects under way, which, if put through, will require a very heavy tonnage of plates, but some of these projects have not been financed as yet, and it may be some little time before they actually develop. The projectors are trying to cover on the plates needed for this work while prices are low, but the mills are trying to avoid, as much as possible, taking on large contracts for plates for extended delivery at present low prices. We quote 1/4-in. and heavier plates at 1.25c. to 1.30c., at mill.

Structural Material.—The structural trade has probably shown more actual improvement than any other line, and a great deal of new work is in sight, much of which is expected to be placed in the near future. The American Bridge Company is reported to have closed in May for close to 200,000 tons, and has taken the material for the new Union Hotel at Salt Lake City, 3000 tons. The McClintic-Marshall Construction Company has taken about 2500 tons for the Pennsylvania Tunnel & Terminal Company in New York, an interest of the Pennsylvania Railroad, and is the lowest bidder on a bridge at Franklin, Pa., about 500 tons. Several very important jobs are just on the eve of closing, and two of the leading structural interests are firmer in their ideas as to prices, and are not taking work at low figures which they would have been glad to consider some time ago. The general market on beams and channels up to 15-in. is 1.25c. for large lots, while on the general run of small orders 1.30c. is quoted.

Steel Bars.—Actual orders for steel bars booked by the leading makers in May were more than double in April, and specifications against contracts are coming in so freely that several of the leading mills are five to six weeks behind in delivery. The demand for iron bars continues somewhat slow, but a better business is looked for in June, as it is probable that a number of the Western bar iron mills will close June 30, pending settlement of the wage scale with the Amalgamated Association. A three days' session was recently held between conference committees of the Amalgamated Association and the Western Bar Iron Association, the latter embracing practically all the independent bar iron mills in the West, but it adjourned on Saturday, May 29, without an agreement being reached, the understanding being that the committees will come together again upon a call from either side. We quote steel bars at 1.20c. to 1.25c. and iron bars at 1.30c. to 1.35c., f.o.b. mill, Pittsburgh.

Tin Plate.—This trade is very active. The American Sheet & Tin Plate Company is so pushed to get out orders that it is getting its Demmler Works, containing 11 hot mills, ready for operation, and it will probably be started this week. This is the last of the serviceable plants owned by this company to be started, and it will be operating to practically 100 per cent. when the Demmler Works starts. Specifications against contracts are coming in very freely, shipments of tin plate by the mills in May showing a heavy increase over April. The leading interest gained practically at the rate of 1000 tons a day in sheet and tin mill products in May over April, and leading independent tin plate mills, such as Pope, McKeesport, Phillips, Standard and Griffiths also report a heavy increase. We are advised that 100-lb. cokes are firm at \$3.40, Pittsburgh.

Sheets.—This trade is slower in showing betterment in demand, and there is more or less complaint about cutting in prices by three or four mills. The leading interest is operating to about 65 per cent. of its serviceable sheet mills, but some of the independent mills are running to practically full capacity. We quote one-pass box annealed black sheets, No. 28 gauge, at 2.20c., and No. 28, galvanized, at 3.25c., but these prices are being shaded on good orders. The regular price of painted roofing sheets, No. 28, is 1.55c. per square,

and of galvanized, No. 28, is 2.80c. per square, for 2½-in. corrugations, but these prices are also being shaded.

Hoops and Bands.—Actual orders are still confined mostly to small lots to cover current needs. The nominal price of hoops is 1.60c. and bands 1.20c., with steel card extras on the latter, and it is stated that while these prices are still being slightly shaded, they are more firmly maintained than for some time.

Spelter.—Prices are slightly higher, but the demand does not show much betterment. We quote prime Western grades at 5c., East St. Louis, equal to 5.12½c., Pittsburgh.

Spikes.—Specifications on contracts for railroad spikes placed some time ago are coming in quite freely, but new orders are mostly for small lots for repair work. The demand for the smaller sizes of spikes is quite active, and makers are filled up on these sizes for the next six weeks or longer. We quote railroad spikes at \$1.60 to \$1.65 for 5½ x 9-16 in., and \$1.70 to \$1.75, base, for the smaller sizes, in carloads and larger lots, 5c. per keg additional being charged for less than carloads.

Merchant Pipe.—Some heavy contracts for line pipe have been placed in the past week, and other large orders are pending. The People's Natural Gas Company has bought 60 to 70 miles of 14-in., the Oklahoma Natural Company 20 miles of 12-in., and the Ohio Fuel Supply Company 80 miles of 18-in. This last order was divided between two local pipe mills and is to be used in taking gas from the fields in Weston, W. Va., to the Cincinnati District. Some further heavy inquiries for line pipe are in the market and are being figured on, but they are not ready for publicity, as rights of way and other matters have to be arranged. The Youngstown Sheet & Tube Company had the largest month of orders and specifications for pipe in May than it had in any previous month in its history. Reports were current that prices of pipe would be advanced about June 1, but this was not done, and it is stated that there will be no change in prices for some little time. We are advised that the minimum discounts of 81 and 5 off list on steel pipe and 78 and 5 per cent. off list on iron pipe are being maintained.

Boiler Tubes.—New orders for railroad and merchant tubes are reported to be a little more plentiful, but from point of demand this trade is very unsatisfactory. Prices are a little firmer, but regular discounts on tubes printed elsewhere are being more or less shaded.

Iron and Steel Scrap.—The market has not been quite so active in the past week. Some large consumers are refusing to pay the high prices asked by dealers, while other users are willing to take in material at present prices, believing that the market will be higher, especially on heavy steel scrap. The scrap situation presents an interesting study at the present time, the consumption having increased very materially in the past several months, and dealers who have held large stocks of scrap for a long time in the hope of a better market are still inclined to keep their material, believing the market is coming their way. One large consumer in the Monessen, Pa., District, has bought heavily in the past two or three weeks, but is now pretty well filled up and is temporarily out of the market. We quote heavy steel scrap for Steubenville, Monessen, Leechburg and Follansbee delivery at \$16 to \$16.50, most dealers refusing to sell under the higher price. For Pittsburgh and Sharon delivery, the market is \$15.75 to \$16. Cast iron borings are \$9.75 to \$10; bundled sheet scrap, \$12.50 to \$13 at point of shipment; No. 1 cast scrap for foundry use, \$14.75 to \$15; No. 2, \$14; No. 1 railroad malleable, \$14 to \$14.50; sheet bar crop ends, \$16.75 to \$17; grate bars, \$12; rerolling rails, \$16 to \$16.50; low phosphorus melting stock, 0.04 and under, \$18.50 to \$19; old car wheels, \$16.25 to \$16.50; locomotive axles, \$22 to \$22.50; locomotive tires, \$17.50 to \$18; machine shop turnings, \$11.50 to \$12; iron rails, \$17 to \$17.50; iron axles, \$18.50 to \$19, all per gross ton, f.o.b. Pittsburgh, unless otherwise stated. We note sales of 500 tons of turnings at \$12, delivered, equal to \$11.35, Pittsburgh, and 200 tons of cast iron borings at about \$9.75, Pittsburgh.

Coke.—Another furnace interest in the Cleveland District has covered for its supply of furnace coke for delivery in the last half of the year on the basis of about \$1.60 per net ton at oven. Most of the furnaces are now covered on their supply for last half, but some business in foundry coke is in the market, two large inquiries having come out in the past week. The parties in charge of the proposed consolidation of a large number of coke works in the Connellsville and other regions are still at work on the project, but it is said that progress is slow. Two or three large coke interests have refused to give options on their plants, and this is operating against the success of the proposed merger. It is stated that as high as \$5000 per acre for coal lands is being asked by some of the coke makers for their properties. Standard makes of furnace coke for spot shipment can still be had at about \$1.50, at oven, while for last half of the year \$1.60 to \$1.65 is usually quoted, and a very heavy tonnage has been closed at these prices. Best makes of 72-hr. foundry coke are held at \$1.80 to \$1.85, for prompt shipment, while on contracts for last half from \$2.10 up to

as high as \$2.35 per net ton is being quoted. The output of coke in the Upper and Lower Connellsville regions last week amounted to 278,729 net tons, an increase over the previous week of more than 25,000 tons. The H. C. Frick Coke Company has blown in more than 1100 ovens in the past week.

San Francisco.

SAN FRANCISCO, CAL., May 26, 1909.

There is more activity in the Pacific Coast market than for nearly a year. While the improvement observed in the last fortnight is not unusually great, a satisfactory volume of business has been booked in practically all lines of finished products, and conditions are favorable for an increasing demand. A liberal buying movement is taking place in wire and wire products, which had been only moderately active earlier in the season. Good orders are still being received for merchant pipe, and the tonnage of cast iron pipe booked is about up to that of the few weeks previous, with more inquiry from the smaller consumers. Several large contracts have been let for structural work, some of which is being done at rather better prices than have prevailed of late. Bars of all descriptions are moving somewhat more freely, with an especially active demand on reinforcing material. There is little or no improvement in sheets, but numerous small orders for plates are being taken by local merchants. A little more inquiry is coming out for boiler tubes, but the local demand in this line is never of much consequence.

Rails.—No heavy rail tonnage of any consequence has been booked on the Coast of late, and most of the numerous projects for railroad construction in California which have been under discussion for some time are taking shape very slowly. Orders for light rails continue moderate, as the mining industry in this State and Nevada, which usually orders liberally at this season, is still in a depressed condition. There is moderate activity in the extension and repair of street and interurban lines, but most of the immediate requirements are covered by former contracts.

Structural Material.—Local contracts have been coming forward in good shape during the latter part of the month, most of the projects which were being figured a few weeks ago having been let, and the tonnage is probably larger than at any time in the last year. With a number of additional jobs to be let during the first two weeks of June, the local fabricators anticipate an active summer. Much of the work in hand was taken on at figures which allowed little profit, but prices are now beginning to show more firmness. While more attention is being turned to the erection of large buildings of the lower classes, plans are gradually taking shape for a large number of Class A structures which were projected during the recent depression, and which will in all probability be carried out the present year. A contract for about 1500 tons for three wharves at Fort Mason and one for 240 tons for the Boalt Hall at the University of California have been awarded to the McClintic-Marshall Construction Company. The Pacific Rolling Mills Company has taken the contract for two buildings for the local fire department, requiring about 300 tons, and for two other structures—one for H. M. Heineman, at Bush and Sansome streets, and one for Daniel Roth, on O'Farrell street, near Mason—calling for about 500 tons in the aggregate. A fair tonnage has also been taken on by the Schradner Iron Works, and a small contract has been let for the Bohemian Club Building. Numerous contracts of less importance have also been taken on by the smaller local fabricators, all of whom are fairly busy, and a large steel lumber mill at Eureka, Cal., is to be erected by a Los Angeles interest. The St. Mary's Hospital contract, amounting to about 600 tons, is still pending. Proposals for the City and County Hospital, requiring nearly 3000 tons, are to be opened June 9, and a large harbor contract will come up about the same time. The Stanford University is now in the market for about 230 tons for the reconstruction of the chapel. Between now and July the Southern Pacific will make arrangements for some bridge work in the Sacramento Valley, including the replacing of a trestle on the Yuba River. Among the buildings which will come up in the near future are a four-story structure on Kearny street, near Bush, a six-story building on Market street for the Wm. Ede Company, two hotel buildings for the Pringle Company and a five-story structure for the Olympic Club.

Pig Iron.—Several good sized contracts have been given out lately for structural cast iron work, columns, bases, &c., as well as ornamental castings, and while the prices for such work are generally unsatisfactory the tonnage moving is greater than for some time. The immediate requirements for other work are still rather small, though there is a little inquiry for machinery work of various descriptions. The local foundry interests show little disposition so far to buy pig iron either for immediate or future delivery, and sales seldom comprise more than a few tons. The larger foundries have large supplies above their present needs, and some of the importers are also holding large lots in the yards and

warehouses. No further shipments of foreign iron have arrived here since last report, but 1200 tons arrived at Puget Sound. A little more activity is expected in the local market in the next few months, as the demand for foundry work of various descriptions is increasing to some extent and the city is expected to require about 1000 tons in connection with the salt water system. Prices are about as before, Continental and Alabama iron being quoted at \$21 to \$21.50; Chinese and English, \$22 to \$22.50.

Coke.—The market continues very quiet, with supplies still considerably in excess of what the local market can absorb. A cargo of 2630 tons arrived last week. Holders are quoting \$11 on German Syndicate and \$13 on English coke, but it is difficult to move any large quantity except at liberal concessions.

Cast Iron Pipe.—The tonnage booked in the past two weeks compares very favorably with that of any similar period since the first of the year, not counting the large order for San Francisco. Buyers show no hesitation in placing orders, and while the individual contracts of late have been rather small, they are unusually numerous. Moderate lots have been placed for several of the smaller municipal works, and the gas and water companies all over the State are coming into the market for their summer's requirements, which in some cases will be considerable. The gas company at San Luis Obispo, Cal., is preparing to lay 18,000 ft. of new pipe. The Los Angeles Gas Company is also planning several extensions. The town of Grass Valley, Cal., is planning a new water system, and Eureka, Cal., is considering the installation of a salt water system for fire protection. The town of Madera has disposed of a bond issue for the installation of a water system. The town of Aberdeen, Wash., has let a small contract. Bids will shortly be called for a new pipe line at Portland, Ore. Estimates are being taken on a new pipe line for Baker City, Ore. A water system is soon to be installed at the new town of Prince Rupert, B. C., the terminus of the new Grand Trunk Transcontinental. Other projects are numerous, but of little importance. Prices are quite firm, the San Francisco quotations being \$34.50 for 6-in. and over, \$35.50 for 4 in. and \$1 extra for gas pipe.

Merchant Pipe.—The movement of steel pipe to the Pacific Coast is larger at present than for many months, and the business appears to be well distributed among the various interests. Small buyers all over the State continue to send in their orders, and with a general distributive movement the local merchants who were inclined to confine their buying pretty closely to the current needs, are beginning to follow a more liberal policy. A good tonnage has already been booked from the oil fields, and a number of new projects in that section are developing rapidly, after a long period of dullness. A number of interests in the Bakersfield and Coalinga districts have combined to construct a pipe line to Port Harford, a distance of 70 miles, with feeders from 40 to 60 miles, making about 220 miles altogether. Arrangements are about complete, and construction is to begin August 1. The main line will be 8-in. pipe. A 12-in. water pipe line, probably using steel pipe, is also projected for the oil fields. Plans have been prepared for a steel water pipe system at Orofino, Idaho.

Old Material.—Activity is increasing in steel melting scrap and prices are fairly firm, though there has been no quotable advance. Some of the local interests are said to be paying some attention to this material at present, though the market here is necessarily confined to narrow limits, and the only transactions of much importance are for shipment. While no further shipments have been sent out since last report, a considerable tonnage is to be moved to Eastern or foreign ports this year, disposing of the bulk of the material left by the fire. A small lot of scrap steel was recently sold by the Mare Island Navy Yard. All grades of cast iron scrap are now comparatively quiet, but no large tonnage is being added to the stock now on the market, and offerings are firmly held in anticipation of a larger demand during the summer. Prices are \$16 to \$18, for light and heavy material, respectively.

The prospective reduction of freight rates to points in the mountain district east of California is causing some disturbance among local jobbers, though the move was not unexpected by them. It will cut off a large part of the territory in Nevada, &c., formerly covered by Coast merchants, confining their trade to a limited region along the Coast. The change will, however, probably bring about a rapid development in Nevada, which has been greatly handicapped in the past by high rates, and the Eastern interests will be the gainers. The trade of the Coast cities is not likely to be seriously affected, as their trade east of the Sierras has been of relatively moderate importance.

The Berger & Carter Company has moved its sales department and general office to 503-505 Mission street, the company's warehouses being still maintained at Seventeenth and Mississippi streets.

The Pacific Coast Steel Company was incorporated last week with a capital stock of \$1,000,000, by D. P. Doak, F.

M. Doak, S. C. Densom and L. Macomber. The company is an outgrowth of the Doak Sheet Steel Company, which is now building an extensive plant at South San Francisco. F. M. Doak states that the company will produce steel, obtaining ore from its mines in California and from Mexico.

Three locomotives and a lot of equipment belonging to the Oregon Railway & Navigation Company were destroyed in a roundhouse fire at Wallace, Idaho, May 12.

The Public Buildings Commissioners of Oregon are planning to rebuild the foundry recently destroyed at the State Penitentiary.

The Moore & Scott Drydock Company, which recently acquired the Boole shipyards in Oakland, is getting a large proportion of the marine work at this port at present. A \$12,683 contract was taken last week for repairs to the United States Transport Buford.

The Pacific Fruit Express has started work on a large car shop at Roseville, Cal.

The California Lock & Hardware Company is installing a large plant at Riverside, Cal.

The affairs of the Pacific Nail & Iron Works of Oakland, were brought to a close last week by the sale of its real estate. The company has been in process of liquidation for many years.

Cleveland.

CLEVELAND, OHIO, June 1, 1909.

Iron Ore.—The market shows further improvement. A very satisfactory tonnage was sold during the week in lots ranging from 10,000 to over 100,000 tons, and a number of inquiries are still pending. One interest reports that its output for the year is nearly all sold. Nearly all the other mine operators have sold considerable quantities. A large number of consumers, however, are holding off and are not expected to cover for their requirements for some time. Some of the Eastern furnace interests made purchases during the week. While the strike on the lakes is causing considerable trouble, it is not interfering seriously with the operation of boats, and all the ore that is needed is being brought down the lakes. Although definite information on the subject is being withheld, it is claimed that the members of the International Longshoremen's Association have voted for a strike on the coal and ore docks and that the president of that association may call a strike at any time. The dock managers say that the hoisters and engineers, who have signed contracts, will remain at work if a strike is ordered and that there will not be much delay in unloading boats. A conference of the National Civic Federation with the arbitration boards of the various lake States, to attempt to settle the seamen's strike, will begin in this city to-day. Ore prices at Lake Erie docks, per gross ton, are as follows: Old Range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; Old Range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Pig Iron.—Little tonnage for delivery in this territory has been sold in the past week, although a number of inquiries have come out for lots of foundry iron, ranging from 200 to 500 tons. Prices continue firm with an upward tendency. Local furnaces and some of the Valley interests are fairly well filled for the last half, and will take on no more orders at a \$14.50 price for No. 2. On some desirable lots they have made a quotation of \$14.75, but without getting the business. For the last half \$14.50 is regarded as the minimum Valley price, but this can probably be shaded for spot shipment. A few inquiries for foundry iron for the first quarter of 1910 have come out, but furnaces have not quoted prices for that delivery, not being disposed to sell that far ahead. A local interest reports an improved demand for foundry iron for delivery from its furnace in the Pittsburgh District, and made a number of sales during the week, among them one 4000-ton lot, one 2000-ton lot and one 1500-ton lot. The demand from the East, particularly New England, continues fairly good. We quote, delivered, Cleveland, for the last half, as follows:

Bessemer	\$15.90
Northern foundry, No. 1	\$15.05 to 15.90
Northern foundry, No. 2	15.15 to 15.40
Northern foundry, No. 3	14.65 to 14.90
Gray forge	14.00 to 14.50
Southern foundry, No. 2	15.60 to 16.10
Jackson County silvery, 8 per cent. silicon	20.05

Coke.—The market is slightly firmer and there is a little more activity in foundry grades. Some contracts were closed during the week at \$2 per net ton, at oven, for standard 72-hr. Connellsville foundry coke, for delivery the balance of the year, and at \$2.25 for delivery until July 1, 1910. Standard furnace coke is held at \$1.55 to \$1.65, at oven, for spot shipment, and \$1.70 to \$1.85 on contract.

Finished Iron and Steel.—The volume of specifications is holding up well. Although the aggregate tonnage ordered is not as heavy as a few weeks ago, one or two of the leading independent producers report that their orders are as plentiful as at any time since business began to revive. Because of the delay in deliveries, consumers are anticipating their requirements more than they were when shipments could be made promptly. In spite of the fact that the major-

ity of the large consumers are covered with contracts, there is a fairly good volume of inquiries for small lots of material, principally structural, for specific work, and some of the mills are unable to take these orders because of inability to make deliveries as soon as desired. No new structural work requiring large tonnages has developed in this territory, but a very satisfactory amount of small work is coming up. Local fabricating plants have enough on hand to keep them busy for some time, but low prices are still being quoted. The Interstate Engineering Company, which secured the contract for the Brown Building, Cleveland, 1300 tons, has placed the contract for the plain material with the Jones & Laughlin Steel Company. The demand for plates shows an improvement, there being a better volume of orders from boiler and tank shops. The demand for sheets is only fairly good and prices are irregular, considerable shading still being done. On steel bars, plates and structural material regular prices are being maintained. The demand for shafting continues good, but prices as yet show no improvement. The demand for iron bars has picked up somewhat. The two local mills have received some good specifications from railroads the past week and are both running. We quote iron bars at 1.25c. to 1.30c., Cleveland. Bar iron prices, however, are irregular, and some of the Western mills are reported to be quoting very low prices. Jobbers report an improvement in orders. Owing to the fact that mills are now well filled and cannot make prompt deliveries, warehouse business has picked up considerably.

Old Material.—Heavy melting steel is slightly weaker in this market, following a spurt last week during which prices were forced up by dealers who had sold short seeking to cover. Otherwise the market is firm and prices on a few grades have advanced 50c. a ton. Dealers report a fair volume of business during the week, sales being mostly for delivery in the Pittsburgh District. The local mills are not buying much, although there is some improvement in the demand for iron making scrap. The Lake Shore Railroad has a list out of 1500 tons, and the Wheeling & Lake Erie a list of 500 tons, both of which will be closed this week. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$14.00 to \$14.50
Old iron rails.....	16.00 to 16.50
Steel car axles.....	19.00 to 19.50
Old car wheels.....	14.50 to 15.00
Heavy melting steel.....	14.00 to 14.50
Relaying rails, 50 lb. and over.....	21.50 to 22.50
Agricultural malleable.....	12.00 to 12.50
Railroad malleable.....	13.50 to 14.00
Light bundled sheet scrap.....	8.00 to 8.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$17.00 to \$17.50
Cast borings.....	6.50 to 7.00
Iron and steel turnings and drillings.....	8.00 to 8.50
Steel axle turnings.....	9.00 to 9.50
No. 1 busheling.....	12.50 to 13.00
No. 1 railroad wrought.....	13.00 to 13.50
No. 1 cast.....	12.00 to 12.50
Stove plate.....	10.50 to 11.00
Bundled tin scrap.....	9.25 to 9.75

Buffalo.

BUFFALO, N. Y., June 1, 1909.

Pig Iron.—Inquiry is still well maintained, although not as brisk as for some weeks past, contracts having been placed for the principal portion of present requirements and for the immediate future. The tone of the market for last half deliveries is improving and most furnaces seem to prefer to await the better prices anticipated rather than accept current prices for the latter part of last half deliveries. Shipments on contracts are heavy and increasing, distributed on almost all grades, and prospective conditions are looked upon as being very good. Prices for spot delivery are stiffening and one interest will not consider less than \$15.25, Buffalo, for No. 2 foundry. We quote as follows for second and third quarter deliveries, f.o.b. Buffalo:

No. 1 X foundry.....	\$15.25 to \$15.75
No. 2 X foundry.....	14.75 to 15.25
No. 2 plain.....	14.50 to 15.00
No. 3 foundry.....	14.25 to 14.75
Gray forge.....	14.25 to 14.50
Malleable Bessemer.....	14.50 to 15.50
Basic.....	15.50 to 16.00
Charcoal.....	19.50 to 20.00

Finished Iron and Steel.—Orders for steel bars, plates and shapes keep coming in in large tonnages, and the volume of specifications on contracts is very heavy. As a rule deliveries cannot be promised under four to six weeks, owing to the abundant volume of business the mills already have in hand. The Lackawanna Steel Company and two other mill interests have advanced the price of steel bars to 1.25c., Pittsburgh. Prices for structural material are firmer, and it is the general opinion they will soon go higher. Bids will be received this week for structural steel for the Custodial Asylum, at Rome, N. Y., about 250 tons, and within a short time for the steel for the W. H. Granger & Co. eight-story warehouse, Buffalo, about 500 tons. The Charles F. Ernst Sons Iron Works was low bidder for the structural and ornamental iron in the Brantford place school building,

Buffalo, about 150 tons. The Wm. R. Compton Realty & Building Company, Elmira, has been awarded contract for the City Hospital building, Cortland, N. Y., involving the use of about 75 tons of concrete reinforcing bars.

Old Material.—The market exhibits continued improvement in tone and an increasing trend toward higher prices. There is an active inquiry from consumers, but the advancing prices asked by dealers restrict sales to small quantities in most instances. The price for heavy melting steel was forced up from \$1 to \$1.50 per ton over quotations of a week ago, owing to the persistent demand on this market by Pittsburgh consumers. We quote dealers' asking prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel scrap.....	\$15.00 to \$15.50
Low phosphorus steel scrap.....	19.00 to 19.50
No. 1 railroad wrought.....	15.25 to 15.75
No. 1 railroad and machinery cast scrap.....	14.75 to 15.50
Old steel axles.....	16.50 to 17.00
Old iron axles.....	19.00 to 19.75
Old car wheels.....	14.50 to 15.00
Railroad malleable.....	13.50 to 13.75
Boiler plate.....	12.50 to 13.00
Locomotive grate bars.....	12.00 to 12.50
Pipe.....	11.50 to 12.00
Wrought iron and soft steel turnings.....	8.50 to 9.00
Clean cast iron borings.....	7.00 to 7.50
No. 1 busheling scrap.....	13.00 to 13.50

Cincinnati.

CINCINNATI, OHIO, June 2, 1909.—(By Telegraph.)

Business in iron and steel lines is quiet, attributable thus early by some to the breaking in of the holiday, but by most authorities to the customary lull that follows any heavy buying in a bargain market. The feeling is better, and the belief is general that the second half will usher in a period of gradually bettering conditions all round. The scrap men are the busiest at this particular time. Coke is gaining, particularly foundry, and the stiffening up of the finished material men has brought in some hesitating ones in bars and structural material. A representative of one of the largest American establishments making a specialty of machine tools said to-day that April showed a better record in sales and orders at his plant by 30 per cent. than in any preceding month for two years; that May closed with double that increase, and that his concern is now on full time and running practically normal.

Pig Iron.—June has opened very dull, with practically no inquiries in this market. A number of large melters have feelers out for \$11, Birmingham, iron, for the last half, and one prominent stove maker has bought some spot iron at that figure, and \$14, Valley furnace, for Northern, and offers to take a good sized tonnage for the last half at the same prices, but latest information obtainable indicates that he has been unsuccessful. The largest pipe interest is also said to be making some offers on last half iron. The large interest making sanitary appliances in the market last week has probably deferred buying the tonnage mentioned in last report, and the Ohio making interest which was in the market for basic is also said to have postponed buying. The claim is made that opportunities for \$11 Southern iron have narrowed to \$11.25 for spot shipment, although there is not enough interest in the market just now to reflect any precise condition. The Southern market for No. 2 foundry is now universally \$11.50, Birmingham, for third quarter, and \$12 for last quarter, with some furnaces asking \$12 for the last half. Although Southern iron appears at this juncture to be weaker, there appears to be absolutely nothing doing in Northern iron, which is held at \$14.50, Iron-ton, for any delivery. The Ashland Iron & Mining Company has put in one furnace on ferrosilicon, at Ashland, Ky. There is no change in high silicons, and practically no sales are reported. Such foundry iron as is moving is in small lots for immediate shipment. For June delivery and into the third quarter, f.o.b. Cincinnati, freight rates being \$3.25 from Birmingham and \$1.20 from Iron-ton, we quote as follows:

Southern coke, No. 1 foundry.....	\$15.00 to \$15.50
Southern coke, No. 2 foundry.....	14.50 to 15.00
Southern coke, No. 3 foundry.....	14.00 to 14.50
Southern coke, No. 4 foundry.....	13.50 to 14.00
Southern coke, No. 1 soft.....	15.00 to 15.50
Southern coke, No. 2 soft.....	14.50 to 15.00
Southern coke, gray forge.....	13.25 to 13.50
Ohio silvery, 8 per cent. silicon.....	19.70
Lake superior coke, No. 1.....	16.20 to 16.70
Lake Superior coke, No. 2.....	15.70 to 16.20
Lake Superior coke, No. 3.....	15.20 to 15.70
Standard Southern car wheel.....	22.25 to 23.25
Lake Superior car wheel.....	21.75 to 22.75

(By Mail.)

Coke.—There is a little increase in interest and shipments on foundry coke, and prices are without material change. Furnace coke is weak, practically all contract business that was pending having been closed within the past three or four weeks. Spot Connellsville foundry ranges from \$2 to \$2.25 at oven, and on contract up to \$2.50; furnace is still obtainable at \$1.60 for early delivery and up to \$2 on contract. Wise County foundry and furnace grades are un-

changed. Pocahontas is obtainable at about \$1.75 for furnace grades, and foundry ranges from \$2.15 to \$2.25.

Structural Material.—All agencies report a good demand for structural material, with the bulk of the business in this market going South and Southwest. Indications are that there will be considerable heavy building in this territory the coming year, and a number of engineers and architects have important propositions on their boards.

Bars and Sheets.—Steel bars have strengthened, and the price is now firm at close to 1.25c., Pittsburgh, a half dozen interests reporting that price, with no disposition to go after business, and two or three of the larger interests out of the market altogether. The 1.25c. price contemplates immediate shipment, and it is understood that no business is being booked beyond July 1 at that level. On sheets the current prices are unchanged, but it is understood that an advance is slated for July 1. The Andrews Steel Company has seven hot mills of its 10 in operation, and expects to have the entire 10 in on Monday, June 7. This interest is booking business only to July 1. Galvanized sheets are having the best sale in this territory.

Old Material.—There has been a further advance on some lines of scrap, and dealers here have shipped a heavy tonnage into Pittsburgh territory. Heavy melting steel has been a good seller, and the price is in the neighborhood of \$14.50, with some dealers getting \$15, f.o.b. Cincinnati. Relayers are gaining in interest also, as are old car wheels. Dealers are still buying, anticipating a heavy business in the late summer and early fall. We quote dealers' asking prices, f.o.b. cars, Cincinnati, as follows:

No. 1 R. R. wrought, net ton.....	\$14.50 to \$15.00
Cast borings, net ton.....	6.75 to 7.25
Heavy melting steel scrap, gross ton...	14.00 to 15.00
Steel turnings, net ton.....	9.00 to 9.50
No. 1 cast scrap, net ton.....	12.50 to 13.00
Burnt cast, net ton.....	9.50 to 10.50
Old iron axles, net ton.....	17.50 to 18.00
Old iron rails, gross ton.....	15.00 to 15.50
Old steel rails, short, gross ton.....	13.50 to 14.00
Old steel rails, long, gross ton.....	13.50 to 14.00
Relaying rails, 56 lb. and up, gross ton.	21.50 to 22.00
Old car wheels, gross ton.....	14.50 to 15.00
Low phosphorus scrap, gross ton.....	14.00 to 14.50

New York.

NEW YORK, June 2, 1909.

Pig Iron.—No transactions of any special significance are reported, but the demand for moderate lots continues good, and the market is steady. We quote \$16.75 to \$17 for No. 1 Northern foundry, \$16.25 to \$16.50 for No. 2 foundry and \$15.50 to \$15.75 for No. 2 plain, at tidewater. Alabama iron is quoted \$16.25 to \$16.50 for No. 1 foundry, and \$15.75 to \$16 for No. 2 foundry.

Steel Rails.—The only local inquiry is for about 1000 tons of rails for the Manhattan Bridge. The total of May rail orders is estimated at about 300,000 tons, of which the Chicago District mills booked more than half.

Structural Material.—While a slight improvement in prices for bridge work is noticed, the bids on steel buildings show irregularity, and on important building contracts a close approach is made by some bidders to the lowest level touched in the sharpest competition of April and early May. It is evident that to a good many fabricating interests 1909 will be a year devoid of profit. In the past week the chief Eastern contract let was for the Boston & Albany grain elevator at South Boston, Mass., requiring 5200 tons. The Boston & Albany has also let about 1500 tons of bridge work, which went to the McClintic-Marshall Construction Company. For the Lovejoy wharf at Boston the American Bridge Company will fabricate the steel, about 800 tons. The second installment of the steel work for the Sunnyside Yard of the Pennsylvania Tunnel & Terminal Company, 1700 tons, went to Lewis F. Shoemaker, Philadelphia. The Grand Trunk bridge work in Maine, 660 tons, was awarded to the Pennsylvania Steel Company, and the South Bend, Ind., contract for the same interest, 1400 tons, to the Wisconsin Bridge & Iron Works, Milwaukee. In New York City bids are about to go in on the Vanderbilt Hotel of the City Leasing Company, at Park avenue and Thirty-fourth street, which will require 5000 tons. The award is pending of 4000 tons for the Hewitt-Bryce Building on Park avenue. The West Virginia Pulp & Paper Company is letting to-day the contract for a new mill at Covington, W. Va., 1000 tons. At Chicago the contract for the new Boston store, 5000 tons, is expected to go to a local fabricating company. For the month of May the steel structural contracts let throughout the country amounted to about 250,000 tons, of which the American Bridge Company took 55,000 tons. On beams and channels, cut to length, sold out of stock, we quote 1.75c.

Ferroalloys.—Rumors of price cutting prevail and buyers are shopping about considerably. It is difficult to establish a price for ferromanganese, as there are reports of sales at \$41, but \$42 is generally quoted. Ferrosilicon is in good demand but does not appear to be steady as to price. Some transactions are reported around \$62.25, Pittsburgh, and some shading of that price is indicated.

Bars.—Orders for bar iron are not only more numerous, but individual orders are growing larger. Contracts for 250 tons and larger are now coming out. Bar iron prices are not only strong, but show quite an advance, best refined iron ranging from 1.40c. to 1.45c., tidewater. Steel bars are quoted at 1.36c. to 1.41c., tidewater.

Plates.—Business is quiet in this immediate locality, but prices are firm, tank plates and ship plates being held at 1.46c., tidewater.

Cast Iron Pipe.—The Government has postponed the opening of bids on 8000 tons for Manila, Philippine Islands, until June 10. The general demand is confined to small lots, with only an occasional order running up to 500 tons or more. The market may be quoted at \$23.50 per net ton for 6-in., at tidewater.

Old Material.—The market is strong in practically all lines, as shown in an advancing market. An appearance of scarcity has developed. Those who are in possession of stocks are inclined to hold them for higher prices, while the belief is growing that such stocks are by no means as generally held as was the case last winter. An indication of this is seen in the increasing efforts of dealers to pick up any scattering blocks of old material that can be had. As high as \$14, New York, has been paid for steel scrap. The local market is by no means dependent on eastern Pennsylvania prices, as buyers have been found in other localities who are paying more than a parity with eastern Pennsylvania rates. Not only are orders larger and more numerous for heavy melting steel scrap, wrought scrap and general rolling mill stock, but the foundry trade has also been a better source of business than recently. Quotations are as follows, per gross ton New York and vicinity:

Old girder and T-rails for melting....	\$13.00 to \$13.50
Heavy melting steel scrap.....	13.00 to 13.50
Relaying rails.....	20.50 to 21.00
Old iron rails.....	15.50 to 16.00
Standard hammered iron car axles....	19.00 to 19.50
Old steel car axles.....	17.50 to 18.00
No. 1 railroad wrought.....	16.00 to 16.50
Iron track scrap.....	13.00 to 13.50
No. 1 yard wrought, long.....	13.50 to 14.00
No. 1 yard wrought, short.....	12.50 to 13.00
Light iron.....	8.00 to 8.50
Cast borings.....	9.00 to 9.50
Wrought turnings.....	9.50 to 10.00
Wrought pipe.....	12.50 to 13.00
Old car wheels.....	14.50 to 15.00
No. 1 heavy cast, broken up.....	13.00 to 13.50
Stove plate.....	10.50 to 11.00
Locomotive grate bars.....	10.50 to 11.00
Malleable cast.....	14.00 to 14.50

Metal Market.

NEW YORK, June 3, 1909.

Copper.—A firm tone prevails in the copper market and in some quarters an advance is looked for, it being reported that one large electrical manufacturing company is preparing to make some heavy purchases in this territory and another important interest is making inquiries for a large lot. The shipments to Europe continue heavy, averaging 1000 tons a day, but it is stated in reliable quarters that from 20 to 25 per cent. of the copper being sent abroad is being put in storage, so that feature should be taken into consideration in reviewing the London market. The United Metals Selling Company is quoting 13.50c. for electrolytic delivered in 30 days, and there are bids in the market for August delivery at slightly under that price, but showing an encouraging demand. Prices got a little stronger during the week and to-day lake could be had at 13.37½c. and electrolytic for 13.12½c. There is talk of a proposed advance in sheet copper of ½c., making the base price 17c. The market in London to-day was slightly under our quotations of a week ago, the price for spot being £60 and for futures £60 3s. 6d.

Pig Tin.—There has been some advance in the price of tin under a fairly active demand, which resulted in some brisk trading and a little seesawing in prices. The prices established during the week for 5-ton lots were:

	Cents.
May 28.....	28.95
June 1.....	29.00
June 2.....	29.00

The market had an upward trend to-day, and there were reports late in the morning of sales at 29.10c., so it will not be a surprise if a slightly higher price is established to-morrow. It is not thought that the holiday on Monday had anything to do with the advance in price, it being largely attributed to a healthy demand from consumers. The London market is not very active, and prices are lower than for last week. The quotations to-day were £131 7s. 6d. for spot and £133 2s. 6d. for futures. The arrivals here during the last two days amounted to 780 tons, and there are 2277 tons afloat. The monthly tin statistics for May show that a better business was done than during the corresponding month of last year. The deliveries into consumption amounted to 3900 tons, and the total for five months of this year shows an increase of 2850 tons, compared with the same period last year. The combined deliveries of London and Holland were 165 tons larger than for May of last year. The shipments

from the Straits fell 1847 tons short of the previous May, and Australia shipped 150 tons less than in May, 1908.

Lead.—The lead market continues firm, although there is not an active call for the metal. The price in New York remains at 4.35c., according to the quotations of the American Smelting & Refining Company for 50-ton lots, but in some cases a shade higher than this price has been quoted.

Spelter.—A dull market is reported and some sales have been reported below 5.20c., but that price is quoted by most sellers.

Antimony.—Continued large arrivals of antimony, prompted by the unsettled tariff conditions, helped to maintain the prices which have prevailed during the last two weeks. Hallett's is quoted at 7.75c., Cookson's at 8.25c. and the outside brands around 7.50c.

Tin Plates.—A very quiet market prevails, and prices have not changed in the last few days. Quotations for 100-lb. IC coke plates are \$3.64, New York, and \$3.45, Pittsburgh, with the usual 5c. per box rebate on large orders. In London tin plates went up 1/4d. yesterday, the price established being £11 10s. 1/2d.

Old Metals.—The following dealers' selling prices represent the New York market:

	Cents.
Copper, heavy cut and crucible.....	13.00 to 13.25
Copper, heavy and wire.....	12.75 to 13.00
Copper, light and bottoms.....	11.50 to 11.75
Brass, heavy.....	9.50 to 9.75
Brass, light.....	7.25 to 7.50
Heavy machine composition.....	11.75 to 12.00
Clean brass turnings.....	8.25 to 8.50
Composition turnings.....	10.00 to 10.50
Lead, heavy.....	4.25
Lead, tea.....	3.90
Zinc, scrap.....	3.85

The American Sheet & Tin Plate Company to Enforce the "Open Shop."

Notices have been posted by the American Sheet & Tin Plate Company that after June 30, when the present scale expires, it will not treat with the Amalgamated Association of Iron, Sheet and Tin Workers concerning wages and the operation of its mills. It is the only subsidiary of the United States Steel Corporation which now recognizes labor unions. In the tin plate plants in particular the Amalgamated Association has maintained its foothold. In the strike of 1901 the Steel Corporation transferred a number of its sheet mills from the union to the nonunion list and the Amalgamated Association never recovered the lost ground. Of the 202 mills now operated by the American Sheet & Tin Plate Company it is stated that 131 are operated by union and 71 by non-union men.

A New Acme Thread Rolling Machine.—The Acme Machinery Company, Cleveland, Ohio, is placing on the market a new large thread rolling machine. The thread rolling machines previously made by this company have been in 1 in. and 1/2 in. sizes. The new machine will have a 2-in. capacity. The Acme Company reports an improvement in the demand for bolt and nut machinery. This company is planning additions to its plant for manufacturing and storeroom purposes, but the addition to the manufacturing department will not be built until next year.

The formal opening of the Cleveland Industrial Exposition, Cleveland, Ohio, which will be held in the Central Armory and an adjoining temporary building, June 7 to 21, will take place Monday evening, June 7. Addresses will be made by Charles F. Brush, president of the Chamber of Commerce, under whose auspices the exposition will be held; by F. F. Prentiss, president of the Cleveland Twist Drill Company, and by Mayor Tom L. Johnson. There will be 280 exhibitors.

Governor Hughes has approved a bill incorporating the city of Lackawanna, N. Y., embracing territory on the shore of Lake Erie, immediately south of the city of Buffalo, and including the plant and property of the Lackawanna Steel Company, extending about 2 miles along the lake shore. The new municipality now has a population of about 10,000, including employees of the steel company who live adjacent to the plant.

Iron and Industrial Stocks.

NEW YORK, June 2, 1909.

The transactions of the past week have been compressed in a few days on account of the holidays, but the period has nevertheless been quite an exciting one. The United States Steel stocks made new high records, the common stock especially advancing sharply to much higher figures than anticipated by even the most sanguine. Other iron and steel stocks sympathized with the movement, and made good advances. Republic preferred was conspicuous in this respect. The range of prices on active iron and industrial stocks from Thursday of last week to Tuesday of this week was as follows:

Allis-Chalm., com..	15 1/2 - 16	Railway Spr., com.	43 - 45 1/4
Allis-Chalm., pref..	51 1/2 - 52 1/4	Railway Spr., pref.	105 1/2 - 106
Beth. Steel, com...	28 1/4 - 29 1/2	Republic, com....	28 - 30 1/2
Beth. Steel, pref...	60 1/2 - 62	Republic, pref....	90 1/2 - 97 1/4
Can, com.....	12 1/2 - 13 1/2	Sloss, com.....	83 1/2 - 84 1/2
Can, pref.....	81 - 82 1/4	Pipe, com.....	32 - 33 1/4
Car & Fdry, com...	55 1/2 - 57 1/2	Pipe, pref.....	77 - 78
Car & Fdry, pref...	116 1/2 - 116 3/4	U. S. Steel, com...	60 1/4 - 65 1/2
Steel Foundries...	39 1/2 - 42 1/4	U. S. Steel, pref...	119 - 121
Colorado Fuel....	41 - 42 1/2	Westinghouse Elec.	82 1/2 - 84
General Electric...	161 1/2 - 161 3/4	Chl. Pneu. Tool...	21 1/4 - 21 1/2
Gr. N. ore cert....	71 1/2 - 74 1/4	Am. Ship, com.....	60
Int. Harv., com...	83 1/2 - 84	Am. Ship, pref...	108 - 108 1/2
Locomotive, com...	57 1/2 - 58 1/2	Cambria Steel....	39 - 40 1/2
Locomotive, pref...	115	Lake Sup. Corp...	26 - 29 1/2
Nat. En. & St., com.	15 - 16	Warwick.....	8 1/2
Nat. En. & St., pref.	86 1/2 - 86 3/4	Crucible St., com...	8 1/4 - 8 1/2
Pressed St., com...	42 - 45 1/4	Crucible St., pref...	68 - 70
Pressed St., pref...	103 - 103 1/2	Harb.-W. Ref., pref.	83 - 84

Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 65 1/2, preferred 120 1/2, bonds 105 3/4; Car & Foundry common 57 1/2, preferred 117; Locomotive common 59, preferred 115 1/2; Colorado Fuel 41 1/2; Pressed Steel common 44 1/2, preferred 103 3/4; Railway Spring common 45; Republic common 30 1/2, preferred 97 1/4; Sloss-Sheffield common 82 1/2; Cast Iron Pipe common 33 1/2, preferred 78 1/2; Can common 12 1/2, preferred 81 1/2.

Iron and Steel Bonds.

Chisholm & Chapman, 18 Wall street, New York, report the following quotations:

	Bid.	Asked.
Bethlehem Steel 1st ext. 5s, due January, 1926.....	90	
Bethlehem Steel purchase money 6s, August, 1908.....	115 1/2	118
Buffalo Iron 5s, October, 1925.....	100	103
Buffalo & Susquehanna Iron 1st 5s, June, 1932.....	99 1/4	
Buffalo & Susquehanna Iron deb. 5s, January, 1926.....	95	98
Dominion Iron & Steel 5s, July, 1929.....		100
La Belle Iron Works 1st 6s, December, 1923.....	103 1/2	106
Lackawanna Steel 1st 5s, April, 1923.....	98 1/4	
Maryland Steel 1st 5s, February, 1922.....	100	
Penn Steel 1st 5s, November, 1917.....	100	
Pennsylvania & Maryland Steel 6s, September, 1925.....	109	111
Republic Iron & Steel 1st 5s, October, 1934.....		100
Sloss Iron & Steel 1st 6s, February, 1920.....	106	108
Sloss Iron & Steel consol. 4 1/2s, April, 1918.....	94 1/2	97
Jones & Laughlin 1st 5s, May, 1939.....	99 1/4	100 1/4

United States Steel Corporation.

Collateral Trust 5s, Series A, C, E, April, 1951.....	114 1/2	115 1/2
Collateral Trust 5s, Series B, D, F, April, 1951.....	114 1/2	115 1/2
Sinking Fund 5s, April, 1963.....	105 1/2	105 1/2
Union Steel 1st 5s, December, 1952.....	104 1/2	105 1/2
Clairton Steel 5s, 1908-1913.....	100	
St. Clair Furnace 1st 5s, 1910-1939.....	100	
St. Clair Steel 1st 5s, 1908-1926.....	100	
Illinois Steel deb. 5s, January, 1910.....	100 1/4	
Illinois Steel 5s, April, 1913.....	100 1/2	

All bonds quoted "and interest."

Dividends.—The American Can Company has declared the regular quarterly dividend of 1 1/4 per cent. on the preferred stock, payable July 1.

The International Silver Company has declared the regular quarterly dividend of 1 1/4 per cent. on the preferred stock.

Bureau of Standards Analyzed Samples.—The Bureau of Standards, Department of Commerce and Labor, Washington, D. C., announces that it is ready to distribute an acid open hearth steel with 0.6 carbon, and that a new sample of Bessemer 0.4 carbon is also ready in place of that hitherto supplied, but now exhausted. The next samples to be issued will probably be basic open hearth 0.4 carbon (renewal) and a straight vanadium steel with about 0.2 per cent. vanadium.

The former plant of the Penn Shovel & Mfg. Company, Warren, Ohio, now owned by the Warren Iron & Steel Company, a new concern in which Warren and Pittsburgh men are interested, will begin operations in the rolling mill department next week. The plant has been overhauled and two heating furnaces have been added. The output for the present will be largely agricultural implement steel, disks, &c. The officers of the company are as follows: President, D. L. Helman; secretary, Lucius Jones; treasurer, C. B. Loveless.

Judicial Decisions of Interest to the Iron Trade.

BY A. L. H. STREET.

Employees—Suit for Injury.—An employee held with tongs a piece of lead on an anvil, while three helpers struck it in rotation with heavy hammers. He made a motion with his hand for the helpers to stop, and said "Hold on a minute," and, on observing that two of the helpers stopped, he took hold of the piece with his hand, when the third helper, who did not understand English, struck with his hammer, injuring him. No intelligent co-operation between the helpers was required, except the contiguity of labor involved in striking in rotation and stopping on signal. Comprehension of a sign to stop required no knowledge of any language, and a signal to stop was as efficient as that given by the voice. Plaintiff knew that men unable to speak English were likely to be employed. Held, that the employer was as a matter of law not guilty of negligence in employing a helper ignorant of the English language. Where mere manual labor is required, and there is no occasion for the exercise of discretion, and no expectation of co-operation with other laborers, employees of divers tongues may be employed to work in the same company. (Massachusetts Supreme Judicial Court, *Friberg vs. Builders' Iron & Steel Company*, 98 E. Rep. 897.)

Employees—Suit for Injury.—One employed to operate in the night time a particular machine is not a fellow employee with a machinist employed to keep the machinery in the plant in good order and condition, nor with others employed therein to operate the same machine in the day time, who on request may have assisted such machinist in installing a new pulley connected with such machine, and which, as observed by them, is cracked, and rendered defective and unsafe in the installation thereof, so as to absolve the employer from liability for injuries resulting to such first employee therefrom. The knowledge of those employed on such day shift cannot be imputed to the employee employed on night shift, or render him guilty of negligence in continuing in his employment, unless he had knowledge of such defective and unsafe machinery, or it was so plainly manifest that he ought to have known it. An employee has the right to presume that his employer has provided him a reasonably safe place to work, and it is only after discovering the place to be unsafe that he can be said to have assumed the extra risk of continuing in his employment; and, though after reasonable time allowed him he will be presumed to be aware of, and have knowledge of, apparent defects, yet, to charge him with notice thereof on this ground, such defects and dangers must be unquestionably plain and obvious, so that, if he did not see them, he must necessarily be in fault. (West Virginia Supreme Court of Appeals, *Goshorn vs. Wheeling Mold & Foundry Company*, 64 S. E. Rep. 22.)

Employees—Assumption of Risks.—According to the Montana statutes an employee is conclusively presumed to have assumed ordinary risks of his employment. Beyond such risks he does not assume any risk, except by express agreement, or where he must be presumed to have done so from the fact that he continued in the employment, though the extraordinary danger was known to him, or was so obvious that he must be presumed to have had knowledge of it. An employee has a right to presume that the employer's duty to use ordinary care to furnish reasonably suitable and safe appliances has been observed, and hence his duty is to yield instant obedience in the use of them, and he will not be held to have assumed the risk of any injury of any unusual danger incident to such use, unless he knew of it, or it is so obvious that he must be presumed to have observed it. In an action for injuries to a teamster employed by defendant to deliver heavy iron castings, caused by the breaking of a chain around a casting, the complaint alleged that such chain, which was furnished to plaintiff by defendant, was wholly insufficient and unsafe, in that it was not of sufficient size to bear the weight of the casting, all of which was well known to the defendant, and of which plaintiff was ignorant. Held, that the allegation was not objectionable as importing that plaintiff had, or should have had, knowledge that the chain's tensile strength was sufficient to bear the weight of the casting, and that he, therefore, assumed the risk of the danger incident to the insufficiency of the chain. (Montana Supreme Court, *Schroder vs. Montana Iron Works*, 100 Pac. 619.)

Employees—Assumption of Risks.—Where an employee engaged in piling wire told his foreman that a leaning column looked dangerous, the foreman was negligent in assuring the employee that there was no danger, without first ascertaining whether the column should be braced, particularly after his attention was called to it. Where plaintiff was under the control and direction of another in piling wire, they were not fellow employees, though they worked together at the same time and place, the other being a vice principal. Where the employer, on the employee's complaint as to a dangerous condition in the place of work, assures the employee that the place is safe, the employee's knowledge of

its dangerous condition will only preclude a recovery for injuries resulting therefrom, where the danger was so obvious that a man of ordinary prudence would have refused to continue work at the employer's bidding. (St. Louis Court of Appeals, *Burkard vs. A. Leschen & Sons Rope Company*, 117 S. W. Rep. 35.)

Employees—Assumption of Risks.—Under the Oregon statute which requires every owner of a factory, mill or workshop to provide reasonable safeguards for all machinery which it is practicable to guard under penalty for failure to comply with such requirement, and also gives a right of action to recover damages for any injury to an employee of which such failure is the proximate cause, an employer in such an action cannot invoke the defense of assumption of risk. (U. S. Circuit Court of Appeals, *Welsh vs. Barber Asphalt Paving Company*, 167 Fed. Rep. 465.)

Employees—Fire Escapes.—The New York labor laws (Laws 1897, p. 481, c. 415), Art. 82, requires such fire escapes as may be deemed necessary by the factory inspector to be provided on factories three or more stories high. The revised New York City charter 1901 (Laws 1901, p. 179, c. 466), Art. 407, makes all existing laws relating to the construction, &c., of buildings effective in the city, with power to the aldermen to amend, &c. Held, that section 82 is mandatory, and applicable to New York City, though there its enforcement is intrusted to the department of buildings, instead of the factory inspector, and that the aldermen cannot dispense with the requirement for fire escapes and the owner of a factory building is liable for injury to an employee who was compelled to jump from the third story to avoid burning, where no fire escapes or other means of escape were provided. (New York Supreme Court, Appellate Division, *Maiorca vs. Myers*, 115 N. Y. S. 923.)

Employees—Personal Injury Suits.—In an action by a servant for injuries while working at a die press for defendant, an instruction was requested by defendant that if the jury found that, just prior to the accident, plaintiff called the foreman, stated to him that the machine would not work, and that thereupon the foreman oiled the machine, and told plaintiff it was all right, then, even though the accident happened by reason of the machinery being out of order, plaintiff could not recover, there being no evidence that the foreman was incompetent or that defendant failed to exercise due care in his selection, and that if the jury found that plaintiff had been instructed to throw the lever off when the platen reached the top, and that she neglected to do so, and that, by such neglect, she was injured, then plaintiff could not recover. Held, that the instructions were properly refused as defective in assuming that the machine was a reasonably safe one, and, if properly handled, would perform the work for which it was intended, and in charging that there was no evidence that the foreman was incompetent; there being evidence that he was incompetent to repair the machine when out of order. The owner of a factory who has in use machines liable to endanger the life or limb of the operators is bound to have them examined and repaired by a machinist or other competent mechanic when informed that they are out of repair. (Maryland Court of Appeals, *Wolf vs. Shriver*, 72 Atl. Rep. 411.)

Employees—Duty of Employer.—A derrick that leaned away from a nearby building at an angle of 10 degrees was held in position by its own weight and by a guy rope that ran to such building. At the apex of the derrick a pulley was suspended, through which ran a rope, one end of which was fastened to an iron plunger, weighing 500 lb., that stood between the two legs of the derrick. The other end of the rope was held by the plaintiff and other workmen standing between the derrick and the building. When traction was made on this rope, in order to draw up the plunger, the frame toppled over toward the building, and fell on the plaintiff. Held, that whether or not this result was so obvious that it ought to have been foreseen by the plaintiff, as affecting the employer's liability for the injury, was a question for a jury. An employment is common to employees of the same employer within the rule exempting the latter from liability for injury caused one employee by another when it is performed as part of the duty owing by them to the employer through their employment; and hence the rule does not apply when the duty is one of the employer to the employee. The test is not what agent the employer employed to perform a certain duty, but whether the duty itself was one that he owed to the employees or that they owed to him. If an employer owes to his employees a duty involving the exercise by him of reasonable care, he cannot escape liability for its negligent fulfillment by delegating its performance to one or more of the class to whom such duty is owing. In such case, if the employee employed to perform the duty failed to exercise reasonable care in its performance, the employer is legally chargeable with the fault. A workman, who, in obedience to the orders of his superior, engages in some other than his regular employment, is not on that account to be deemed a mere volunteer, to whom the duty of exercising reasonable care is not owing. (New Jersey Court of Errors and Appeals, *Laragay vs. East Jersey Pipe Company*, 72 Atl. Rep. 57.)

OBITUARY.

FRANCIS X. PUND, Cincinnati, Ohio, died after a brief illness, May 8, aged 58 years. He was born in Cincinnati and at an early age secured a position with Post & Co. After a service of eight years he and one of his fellow employees, George Puchta, bought out the firm and continued the business under the name of Puchta, Pund & Co., which, under the name adopted later of the Queen City Supply Company, became one of the best known and most successful mill and factory supply houses in the country. In 1904, after a long and successful career, he entered the manufacturing business, and with David T. Williams, formerly general manager of the Lunkenheimer Company, founded the now well-known D. T. Williams Valve Company. In this venture he eclipsed his former successes and with his associates helped to build one of the largest valve concerns in the country. He was vice-president of the company at the time of his death and was also a prominent member of various organizations in which he took a great interest. He leaves a widow and three children.

CHARLES E. EVANS, treasurer of the Evans Stamping & Plating Company, Taunton, Mass., died May 26.

FRED. DAVIS, Cambridge, Mass., died May 21, aged 77 years. He was born in Waltham, Mass., and embarked in the foundry business there while a young man. In 1871 he was one of the principals in establishing the Davis & Farnum Foundry Company at Waltham and contributed greatly to its success. He was a member of the New England Guild of Gas Managers, the New England Association of Gas Engineers and the American Gas Light Association. He leaves a widow, one son and two daughters.

N. P. BOWLER, a pioneer foundryman and prominent citizen and capitalist of Cleveland, Ohio, died at Pasadena, Cal., May 28, aged 89 years. He was born in Carlisle, N. Y., and located in Cleveland in 1839. In 1863 he started in the foundry business and established the Bowler Foundry Company, of which he was the active head for many years. He retired from active business nine years ago, but retained the vice-presidency of the company till his death. He was president of the Cleveland Frog & Crossing Company, treasurer of the Cleveland Steel Castings Company and a director of the Bruce-Merriam-Abbott Company, maker of gas engines, besides having interests in other companies outside of iron and steel lines. Mr. Bowler was always largely interested in civic affairs. He was a member of the American Society of Mining Engineers, the Sons of the American Revolution, the Western Reserve Historical Society and other organizations. He leaves two sons, Walter N. and William L. Bowler, and one daughter.

NICHOLAS J. GABLE, secretary of the Burden Iron Company, Troy, N. Y., died in that city May 25, aged 61 years. He was born of Albanian parents in Albany, N. Y., and attended school with John L. Arts, now general manager of the Burden Iron Company, with whom he was in daily association for so many years. Mr. Gable's connection with the Burden Works goes back more than 40 years to the time when he entered the employ of H. Burden & Sons. The Burden Iron Company was incorporated in 1881 and Mr. Gable became its secretary in 1884. He was secretary and treasurer of the Burden Benevolent Association, and in a special way had the confidence and esteem of the owners and employees of the Burden Works. Mrs. Gable died eight years ago, and there are no children living. Mr. Gable had been in ill health for more than two years.

HENRY C. CHALLINGWORTH, superintendent of the foundry of the Short Hill Iron Company, Marshalltown, Iowa, died suddenly in that city May 12, aged 45 years. He was born in England and was one of a long line of foundry foremen. His father, William Challingworth, was foreman of the iron, brass and steel foundry of the Phoenix Iron Company, Phoenixville, Pa., for some 30 years. The deceased was one of his four sons, all connected with the foundry business. He leaves a widow.

O. L. HURLBUT, secretary of the Roane Iron Company, Chattanooga, Tenn., died May 31. He was identified with the company about a quarter of a century, for 15 years as secretary. He left a widow, one son and a daughter.

Labor Notes.

The Glasgow Iron Company, Pottstown, Pa., increased the puddling rate at its mills last week from \$3 to \$3.50 a ton. A reduction from \$4.50 to \$3 had been in effect from March 1, this year.

M. B. Madden, M. J. Boyle and F. A. Pouchat, labor leaders in the Chicago building trades, were found guilty May 29 of extorting a sum of money from a contractor to settle a strike. Each was fined \$500. The trial was a protracted one, the charges having been bitterly contested. Mr. Madden has long been styled the labor czar, and under his administration rumors of irregularities in calling and settling strikes have been frequent. Now that he and his associates have been convicted in a test case, other charges are likely to be pressed in the hope of terminating an intolerable state of affairs.

The International Association of Machinists is reported to be active in recruiting its membership in the East in view of the improvement in business. Of the machinists employed by the Baltimore & Ohio Railroad 200 have been on a strike against the substitution of piece work for day work.

The *Review* of the National Founders' Association says that there were recently on strike in the United States and Canada approximately 300 union iron molders, 200 of these being stove plate molders. In every instance of a strike in a stove foundry the question involved was recognition of the union. It is stated that the Iron Molders' Union is now paying strike benefits to its members in nearly 20 cities of the United States and Canada. The majority of those out on strike were formerly employed in the stove foundries of Hamilton, Ont.

A Large Piping Contract for Gary.—A contract involving a large tonnage of wrought steel pipe, valves and fittings, ranging in size from 3 to 30 in., has been secured by the Best Mfg. Company, Pittsburgh, for the United States Steel Corporation's new plant at Gary, Ind. This material is in part designed to cover the huge piping for the large electric power station, which when completed will embody 60,000 hp. It also covers the complete piping for the blowing engine house and boiler house, all of which includes the necessary valves and fittings for high and low pressure steam, compressed air and auxiliary lines of various descriptions for the four blast furnaces. With this present contract the Best Mfg. Company has received practically all of the entire piping orders up to this time necessary for the Gary plant, the first contracts over a year ago approximating over \$1,000,000. The company has also received an order for the cooling materials for the blast furnaces at Gary, which include pure copper bosh plates, bronze coolers, tuyeres and notches.

President Harris of the Nova Scotia Steel & Coal Company, operating mines, furnaces and steel works in Nova Scotia, Canada, announces a bond issue as follows: "The directors will ask the shareholders to authorize an issue of not more than \$6,000,000 of 50-year bonds bearing interest at a rate not exceeding 5 per cent. The directors also propose to ask authority to make an issue of debenture stock ranking next after the bonds. The authorized issue of this debenture stock cannot at any time exceed the paid-up capital of the company, and at present it is only intended to issue \$1,000,000. This will be a 6 per cent. stock, and the underwriting of this issue has been practically arranged for in London."

The May output of open hearth steel at the Pennsylvania Steel Company's works, Steelton, Pa., was close to the heaviest ever made at the plant. The company is operating all but one of its blast furnaces.

The Machinery Trade.

NEW YORK, June 2, 1909.

The amount of business transacted since our last report was not quite as great as that of the previous week because of the intervening holiday, though it compared favorably with the average of recent weeks. In view of the attention given to recreation, especially by the officials of the more important interests, when an opportunity occurs, like last week, to take a few days' vacation, and the fact that it was the end of the month, machinery houses are much gratified by the business secured. It is thought that shortly after the beginning of June some of the large projects that have been under way for some time will be closed, and that a considerable amount of business will come out that has been held over in order that the expenditures may be put in this month's account. The lack of extensive orders or inquiries the past week is said to be due, to some extent, to this temporary hesitancy on the part of intending purchasers. Practically all machinery houses report more business in May than for any month the past year, and some state that their sales nearly equaled those of normal times. The aggregate of business secured is especially encouraging in view of the fact that there were very few large transactions closed and that the railroads bought sparingly. The coming into the market by the latter would give considerable impetus to the expanding trade.

The Board of Governors of the Machinery Club of the City of New York, at a meeting held Tuesday, June 1, elected the following officers: President, R. C. McKinney, Niles-Bement-Pond Company; vice-president, George A. Post, Standard Coupler Company; secretary, Fred Stadelman, Wellman-Seaver-Morgan Company; treasurer, Charles A. Schieren, Jr., Charles A. Schieren Company.

The Niagara Frontier Purchasing Agents' Association recently held a meeting at the Hotel Statler, Buffalo, N. Y., at which it was decided to increase the membership of the association, which now has among its members many of the prominent purchasing agents of Buffalo, Niagara Falls and vicinity. The object of the association is to promote social intercourse among its members and it desires to get in touch with purchasing agents of manufacturers in its territory. The officers elected were: President, B. W. Robb, purchasing agent Jacob Dold Packing Company; vice-president, David C. Howard, Delaney Forge & Iron Company; secretary and treasurer, George H. Gardner, Howard Iron Works. Executive Committee: C. C. Mosher, purchasing agent Union Carbide Company; H. F. Russell, purchasing agent Lumen Bearing Company; E. W. Kerr, purchasing agent Pratt & Letchworth Company, and A. D. Kysor, purchasing agent Carborundum Company.

Considerable new machinery will shortly be purchased by the General Electric Company, Schenectady, N. Y., for its various shops, specifications for some of which have been issued. The company has asked quotations on a few tools at a time and it is understood that the machines on which it has already received bids, but which have not yet been purchased, constitute a fair sized list. It will be remembered that important improvements are to be made to the Schenectady plant, which will include an addition to the foundry 200 x 485 ft. Construction work on an addition to one of its machine shops was recently started.

The Beebe Syndicate, Syracuse, N. Y., operating the Rochester, Syracuse & Eastern Railroad, Auburn & Syracuse Electric Railroad, Syracuse, Lake Shore & Northern Railroad and the Syracuse & South Bay Electric Railroad, has awarded contract for the construction of a new car repair shop upon a site south of the power house at Lakeland to Edward K. Fenno, Syracuse. The main building is to be 132 x 240 ft., of steel frame and brick curtain wall construction. On completion of the new shops the syndicate will also engage in car building for its various lines, and orders will be placed for the separate parts and assembled by the company. Plans for the shops were prepared by Consulting Engineers Sheaff & Jaastad, Boston, Mass.

The Business Men's Association of Newark, N. Y., has closed arrangements with the Haywood Wagon Company, Walter A. Cook, president, manufacturer of contractors' dumping wagons, Baldwinville, N. Y., by which the latter company will move its plant to Newark. The company intends to erect a factory building about 150 x 500 ft., which will include a machine shop, carpentry shop and assembling room.

Quotations on gasoline engines and a steam heating system, either to be connected with the boilers or independent, are desired by the Dundee Mfg. Company, Dundee, N. Y., which is to rebuild its plant recently destroyed by fire. The plant consisted of a foundry and machine shop, 48 x 120 ft., and had only been in operation since January 1. The company manufactures brass goods, plumbing supplies, &c.

D. G. Ziegler & Co., Jacksonville, Fla., have been retained as consulting engineers for a number of water power developments in the South, and as soon as the various companies are ready to proceed with the work a great deal of mechanical equipment will probably be purchased. Some of these projects include that of the Geneva Power Mfg. Company, Geneva, Ala., incorporated to build a hydro-electric plant on Double Bridge Creek, near Geneva, where 500 hp. can be developed; proposed hydro-electric plant on Allapaha River, near Jasper, Fla., where 10,000 hp. is to be developed, and the Abbeville Power & Mfg. Company, Abbeville, Ala., which has been formed to build a water power plant on Abbey Creek, near Abbeville, where 8000 hp. can be developed.

Bids will be opened at the office of the President of the Borough of Brooklyn, in Borough Hall, Brooklyn, June 10, for the equipment of a pumping engine and power plant for operating the Gowanus flushing tunnel in the Borough of Brooklyn. The security required is \$20,000 and the contract will be let in a lump sum. Specifications can be obtained from the office of the Bureau of Sewers, 215 Montague street.

The bill signed last week by Governor Hughes, making possible the building of subways in New York by private capital, is another move toward the early building of an additional subway in New York. There are four prospective bidders for the construction of the new subway by private capital, and it is said that bids aggregating \$240,000,000 for new subways would shortly be submitted by various interests to the Public Service Commission. It is understood that the commission is desirous of first receiving bids for the construction of the Broadway-Lexington avenue route, and it is likely that plans for that subway will be the first submitted for bids.

Business Changes.

The Murphy Iron Works has moved its New York office to room 1671 Hudson Terminal, 50 Church street, which will be under the management of H. W. Canning, who formerly represented the company in Birmingham, Ala.

Cleveland Machinery Market.

CLEVELAND, OHIO, June 1, 1909.

Machine tool houses generally report their May sales larger in volume than those of the previous month. The market showed more activity during the last half of the month. While there have been no large sales or inquiries for a considerable number of tools the demand is becoming more general, and dealers believe that the condition of the market is better than it has been for some months, and that the improvement that has set in will continue from now on. Sales during the week have been scattered, being confined mostly to single tools in medium sizes. There is more of a demand for large tools, however, than there was a few weeks ago. Very little business came from the automobile builders the past month, but the automobile plants will soon begin to make preparations for their 1910 output, and an improvement in the demand for machine tools from this source is expected the present month. The demand for second-hand machinery is good, there being more inquiry than usual for large second-hand tools. Dealers still complain of a scarcity of second-hand tools.

Nearly all the local builders of machinery and machine tools report some improvement in the volume of their orders. The demand for heavy forging machinery has picked up, and manufacturers of bolt and nut machinery report more sales, although their foreign orders are still light. There is a better demand for industrial cars, but orders are mostly small ones, coming largely from industrial plants whose requirements in that line are not large.

Manufacturing plants engaged in metal working lines outside of machinery, as a rule, report an improvement in business, and are running their plants at increased capacity. During the business depression managers of many plants, that would have otherwise been practically idle, turned their attention to the manufacture of such automobile parts as their plants were fitted to produce, and this work, of which there is still an abundance, together with more business in their regular lines is taxing these plants to their utmost, and some are running on nearly double time.

The Atlas Car & Mfg. Company, Cleveland, will add considerably to the capacity of its plant by the purchase of new machinery. This company has bought a few tools and will soon place orders for some radial drills, double end axle lathes, lathes, one planer and several small tools. The company reports considerable improvement in small orders for industrial cars. It has just received an order for additional electrical railroad equipment for Government canal work in Panama.

The Ajax Mfg. Company, Cleveland, reports considerable improvement in the demand for forging machines. During the past few days it has received an order for eight machines from the International Harvester Company for export to its

European plants. Another order just received is for five machines.

The Canton Drop Forging & Mfg. Company, Canton, Ohio, is planning to build an addition to its machine shop, 50 x 50 ft., and a new office building.

The Board of Trustees of the Cleveland State Hospital will receive bids on June 23 for new boilers and an addition to the boiler house of that institution. Information may be obtained from the superintendent or the architect, Frank L. Packard, Columbus, Ohio.

The P. A. Geier Company, Cleveland, which recently increased its capitalization from \$10,000 to \$15,000, will enlarge the capacity of its machine shop and expects to be in the market soon for several machine tools.

The Lincoln Motor Works Company, Cleveland, Ohio, manufacturer of Lincoln variable speed and constant speed motors, has changed its name to the Reliance Electric & Engineering Company. The business will be conducted under the same management as heretofore.

Cincinnati Machinery Market.

CINCINNATI, OHIO, June 1, 1909.

Had the business of the first two weeks in May been maintained the record for the month would have marked the best volume of sales since May, 1907, according to the testimony of some leading tool manufacturers in this field. Unfortunately a little slump, which developed about the middle of the month, was not overcome the last fortnight and consequently the month ends rather disappointingly, save in the cases of some manufacturers of specialties and one or two makers of tools in the shaper and planer line. One day the last week of the month brought orders for seven shapers to a local manufacturer whose output is still in the modest column, numerically speaking.

With most dealers the month of May showed a better sales record than April, but not so good as March. Sales have been more of single tools. Practically all dealers in this section report splendid inquiries, both in volume and character, and are looking for some good business in the immediate future.

Foundries are still running at about the same rate—viz., three heats per week of from 6 to 12 and 15 tons each. This refers particularly to those making castings for the machine tool trade. Others making a specialty of miscellaneous castings and the smaller variety are running almost full.

Another automobile concern is launched in this territory and its projectors are closely allied to the machine tool trade. This is the Marathon Motor Car Company, which held a meeting the past week and elected officers as follows: President, Powell Crosley, attorney; vice-president, C. P. Garvey; second vice-president, John Rahn, Jr., of the Rahn-Carpenter Company; secretary, Ralph Holterhoff; treasurer, F. H. Simpson; directors, the foregoing and C. L. La Boiteaux and W. H. Carpenter of the Rahn-Carpenter Company. The machines—at present to be confined to two types, a runabout and a touring car—will be built at the lathe manufacturing plant of the Rahn-Carpenter Company, Spring Grove avenue. The preliminary incorporation is for \$30,000. Special features of the new machine will be its speed qualifications. It will be a six-cylinder car, with long wheel base, and the test car recently finished gives good promise.

The Case Mfg. Company, Columbus, Ohio, closes the month with an excellent May record, according to report, which states that the plant is being operated practically to capacity. Orders for over \$17,000 were booked in one day recently, and the sales department reports some excellent inquiries received for cranes and other hoisting machinery.

The new building to be erected in Columbus, Ohio, by the Kinnear Mfg. Company has been awarded the McClintic-Marshall Construction Company.

The new company formed at Lima, Ohio, to manufacture and market the vacuum cleaner invented by Carl W. C. Boegel is made up of the following Lima manufacturers and men of affairs: President, A. L. White; vice-president and general manager, Carl W. C. Boegel; treasurer, W. T. Agerter; secretary, George W. Harrison, who, together with Ira P. Carnes, constitute the Board of Directors and stockholders. For the present the cleaner will be manufactured at the plant of the Lima Locomotive & Machine Company, whose officers are interested in the machine.

An interesting demonstration now in operation in Indianapolis, Ind., is that conducted by the General Electric Company, in charge of C. E. Pruyn, on Monument place. It shows a full line of kitchen and household utensils that can be operated by electricity. The work is receiving a great deal of attention.

The Ralston Steel Car Company, Columbus, Ohio, recently closed a contract with the Missouri, Kansas & Texas Railroad for a number of 50-ton steel flat cars for delivery during the summer, also a contract for 200 or more all steel mining cars. The company reports more orders on its books than at any time since the summer of 1907.

The Miami Valley Machine Tool Company, manufacturer of lathes and sensitive drills, and the Dayton Machine & Tool Works, manufacturer of grinding machines for tool room and manufacturing, both of Dayton, Ohio, have consolidated their businesses and will adopt the name of the former company. David Wilson, who has been sole owner of the Dayton Machine & Tool Works, and who has had long experience in the building of machine tools and special machinery, will be actively connected with the new company and will continue giving his personal attention to the building of the Dayton grinders, as well as the Miami Valley lathes and sensitive drills. The consolidation simply means the enlargement of two growing concerns, which will continue the lines each has already started and will, no doubt, add new tools as the business increases.

Milwaukee Machinery Market.

MILWAUKEE, WIS., June 1, 1909.

The good beginning made in May was sustained until the end of the month, which, as the men on 'Change say, "closed strong with an advancing tendency." A full and definite restoration of business conditions to what they were preceding the panic may be slow in arriving; there is a general feeling here that it will be; but manufacturers of Wisconsin from whom an expression can be obtained are practically unanimous in declaring that trade is gradually settling down to a practically normal basis.

One very convincing proof of this is the fact that the long lines of men formerly waiting each morning for possible employment at the gates of the principal metal working plants and factories have been dwindling from one week to another, until now they have practically disappeared. Skilled mechanics are, in fact, becoming rather difficult to obtain, and ordinary laborers find so much outside work at this season of the year that there threatens to be a scarcity of these before a great while. Designing and erecting engineers are being sought for by local houses with increasing frequency, and the of late unusual spectacle of advertisements for machine tool draftsmen has been appearing in every daily paper of Milwaukee.

Builders of metal working machinery and tools of every description are feeling jubilant over the outlook. Occasionally one is heard to express the view that there will be a further setback before prosperity finally comes to stay, but this is decidedly the exception. Only one factor still causes apprehension, and that is the failure of Congress to agree upon the new tariff law, and the fear that, when the House and Senate measures go to conference, there will be prolonged squabbling. This does not delay the purchase of machinery or materials needed for immediate use, but it prevents the closing of long time contracts for many supplies which will be affected by the new schedules.

A noteworthy feature of the industrial situation, throughout this section of the country, is the extending and improvement of established iron foundries and plans announced for new structures, particularly in connection with manufacturing plants which have heretofore depended largely or wholly upon custom work. The jobbing foundries are, however, viewing with apparent indifference the prospective loss of much of this class of trade, and additions to many such plants are now in progress, as evidenced by the statements in *The Iron Age* the past two or three months. For steel castings the tendency of leading Northwestern machinery builders still seems to be to depend mainly upon outside foundries, and no private plant in this vicinity is at present reported to be putting in the expensive equipment required for that class of work.

The principal development here the past week was the reorganization of the Waukesha Motor Company with an increase of capital stock to \$100,000, and the announcement that a new plant, 100 x 100 ft., with an estimated capacity of 2000 automobile engines yearly, will be erected as soon as a suitable location can be obtained.

The Sparta Iron Works, Sparta, Wis., is having plans prepared for an addition, 40 x 80 ft., with new pattern shop and boiler house.

It is reported that the city of Portage will erect the new plant of the B. F. Freeland Sons Company as a part of the inducement offered it to remove to that place from Sturgis, Mich.

The Baker Mfg. Company, Evansville, Wis., will put up an addition to its factory, with electric power and lighting system. Machinery to be purchased includes engine, generator, boilers, motors, &c.

The Bessemer, Mich., Gas Company, which recently decided to build a new plant, has let the contract for equipping it to the Acetylene Gas Apparatus Mfg. Company, Chicago.

A new steam turbine power plant, 135 x 165 ft., with a 16-ft. steel stack, 200 ft. high, will be built this summer by the Des Moines (Iowa) Edison Company.

A boiler plant and Corliass engine of 300 hp. will probably be required for the new bottling works which C. F. Dallman is building at Antigo, Wis.

Advices from Duluth state that the Oliver Iron Mining

Company has let contract for an electric generator to be installed on one of its Wisconsin properties.

The Kenosha Electric Railway Company is credited with having had plans drawn for a new power plant and substation for its city traction lines.

The Majestic Construction Company, Milwaukee, has secured contract for the new plant of the Bayley Structural Iron Company, and is taking bids from subcontractors for the material usual in such buildings, which will be of mill construction.

Fairbanks, Morse & Co., Beloit, have been given the order for a gas engine driven pumping unit to be installed in the water works at Mapleton, Minn.

The H. W. Johns-Manville Company has ordered a generator of the Bullock type for its new Milwaukee plant. An engine formerly in service will be repaired.

The Alpena Power Company, Alpena, Mich., will build a dam across the Thunder River, near that place, and install machinery to develop 1200 hp.

From Lansing, Mich., it is reported that F. Thoman will erect a four-story brick factory to be operated by electric motors.

The D. J. Murray Mfg. Company, Wausau, Wis., will build an addition to its foundry, 80 x 140 ft., doubling the present capacity.

The Allis-Chalmers Company has given out figures covering 60 days' business in electrical power machinery, which show that during that period a large number of contracts were taken for plants of moderate size, averaging about 400 hp., the aggregate of apparatus for which represents 161,985 hp. This indicates something of the activity now prevalent in that branch of trade.

Philadelphia Machinery Market.

PHILADELPHIA, PA., June 1, 1909.

Generally speaking, there has been an improvement in the volume of business when compared with that taken the previous month, even though reports from individual manufacturers and merchants show that there has been more or less irregularity in the buying. Manufacturers are somewhat better engaged and a few quite satisfactory orders for general equipment have been placed. The local locomotive works received during the week the largest individual order that it has taken for a long time—105 locomotives from the Harriman lines, deliveries on which will begin in about three months. The demand for railroad equipment, both in rolling stock and motive power, is more active, and those engaged in their manufacture as well as those directly interested in furnishing materials for that class of work, are more encouraged with the outlook for business. Industrial establishments show greater activity, and it looks as though the upward movement had at least begun. Milling machines continue the most active of the general list of machine tools. There has been some pretty fair business done in equipment of a special character, and builders of special tools note a better volume of orders. With business in both crude and finished iron and steel on a better basis, and with the continued moderate improvement which is to be noted in those lines, the machinery trade feels that a betterment in the demand is not far distant. It is to be remembered, however, that there is still a vast quantity of idle machinery, and while a major portion of the inactive equipment may not be in shape for immediate service, it will no doubt be some time before prospective buyers of tools feel themselves justified in making purchases, unless absolutely necessary.

The increased activity in shipbuilding is encouraging. Marine engine builders look forward to improved conditions in the near future, as do also those furnishing minor equipment for work of that class. Boiler and engine builders report a better run of business, although competition is sharp. Several orders of comparatively large size are expected to be placed shortly, the most important being that for the power equipment of the Curtis Building.

The foreign demand shows no material betterment. In some instances a larger number of orders is reported, but as a rule they have been confined to tools and equipment of a special nature. Those transacting an established trade abroad in power transmission equipment report a better run of orders, for the most part small, but aggregating a somewhat larger total than last month.

The demand for second-hand machinery has been irregular. By some dealers a better demand has been reported, but with others, however, no improvement is to be noted. Second-hand engines and boilers move slowly. The demand for gas and gasoline engines of the smaller powers shows betterment.

The iron and steel casting plants are transacting a better volume of business, particularly when compared with that of a month ago. There is a larger amount of general business, and a somewhat better demand for machinery castings is reported. Gray iron foundries are taking a larger volume of business than the steel casting plants, but the

outlook for a better demand for steel castings is believed to be more encouraging.

The William Steele & Sons Company has been awarded a contract for a five-story concrete manufacturing building, 66 x 83 ft., at Tulip and Palmer streets, for the A. J. Reach Company. Work on the new addition will be started at once.

The contract for the erection of several additions to the plant of the Ivins, Deitz & Metzgar Company, Seventeenth and Huntingdon streets, has been awarded to the Roydhouse-Arey Company. The improvements include a five-story building, 59 x 184 ft., with wings 48 x 162 ft. and 60 x 105 ft., as well as a third, fourth and fifty story addition to its present factory, on the west side of Marshall street, above Huntingdon. Ballenger & Perot are the architects and engineers.

The Water and Finance Committee of City Council of Camden, N. J., has been authorized to erect a municipal ice plant. This proposition has been agitated for some months, and contemplates the erection of a plant on Cooper's Creek, with a capacity of 50 tons a day, so planned that the capacity may be increased from time to time as desired.

The American Die & Tool Company, Reading, Pa., which has recently been in the market for quite a considerable volume of tools and equipment, has purchased a good portion of its requirements, but is still in the market for several milling machines, a lathe and a tooth chamfering machine. This concern reports a fair volume of business in small tools and a more active demand for die grinders and for gear work for transmission, the recent additional equipment now permitting the production of gears up to 36 in. in diameter.

Henry Disston & Sons, Inc., has placed orders for the machinery equipment of its new machine shop at Tacony. These orders, which will aggregate an expenditure of about \$50,000, were divided among a number of sellers. This concern now contemplates the erection of an entire new plant at Toronto, Canada, its present plant at that point being too small. Four acres of ground have been purchased in that city, with this matter in view, although at this time a final decision in the matter has not been reached.

The Baldwin Locomotive Works has booked an order for 105 locomotives for the Harriman lines, on which deliveries will begin in three months and then go forward at the rate of 10 a week. This is the largest single order that has been taken by Baldwin's for a long time, and, while it does not mean that either forces or working hours will be increased, it is considered very encouraging, as it shows the disposition of the railroads to enter the market more freely.

Chicago Machinery Market.

CHICAGO, ILL., June 1, 1909.

Trade in machinery lines is steadily expanding, and in some directions is beginning to assume proportions that contrast most favorably with the reduced volume of a year ago. The irregularity of distribution is becoming less marked as the general volume of business increases, but complete uniformity in this respect has not yet been reached. Machine tool dealers see in the more numerous inquiries coming into the market a prospective demand that will go far toward filling up the vacant gaps that still remain in shop capacity of tool builders. Actual orders are also more plentiful, and while the great majority of them are small, yet those of considerable size are less infrequent. Among the orders taken last week by a leading distributor of machine tools was one for 10 millers, which formed part of a large equipment purchased by a manufacturing plant. The railroads are, as a rule, inconsequential factors in the market as compared with their normal position as buyers of tools and machinery; but in view of the improvement shown by most of them in earnings and their known needs in this line, it is not expected that they will indefinitely postpone purchases of equipment on a more liberal scale. It is reported that the Minnesota & Ontario Railroad, International Falls, Minn., is in the market for about \$15,000 worth of tools.

The Nickerson-MacFarlane Machinery Company, Tacoma, Wash., has under construction a new machine shop, 80 x 160 ft., which, when completed, will be equipped with modern tools and machinery. The company is now in the market for a 10-ton crane, one 24 in. x 24 ft. shaft lathe, two 18 in. x 12 ft. lathes, one bolt threading machine, one small power hammer and one 9-ft. boring mill.

A new company to be known as the Diamond Iron Works, Ltd., Hammond, La., has been formed to take over the business of the Hammond Machine shop, A. L. Way, proprietor, of that place. Among the improvements contemplated by the new company is the erection of a new foundry for the purpose of making castings which were heretofore made by outside interests. Equipment for this improvement has not been purchased as yet. The officers of the new company are as follows: F. B. Coyne, president and general

manager; A. L. Way, vice-president; F. E. Nellis, treasurer; George E. Boose, secretary, and Geo. F. Smith, superintendent.

Bids will be asked in about 30 days by the city of Delphos, Kan., for machinery and equipment required for the installation of a municipal electric light plant and water works system. An issue of bonds amounting to \$30,000 has been sold to provide means for this improvement.

The El Paso Electric Railway Company, El Paso, Texas, will install a new electric generating unit of 2000 kw., with accessory machinery.

The city of Plainville, Kan., invites proposals which will be received until June 14 for material and equipment required to construct a system of water works. In addition to cast iron pipe, hydrants, valves and a 30,000-gal. steel tower tank, there will be purchased an electric motor or gasoline engine for pumping. Bids will be taken on both a direct connected two-stage deep well turbine pump and a triplex double acting pump.

The Sterns Lime & Stone Company, Chicago, will equip its crushing plant with a motor driven hoist.

New improvements contemplated by the Winona Electric Light & Water Company, Winona Lake, Ind., include the installation of two 300-kw., three-phase electric generators, and two motor driven pumps, one of 1,000,000-gal. and one of 500,000-gal. capacity. About \$10,000 worth of 8-in., and 10-in. water pipe will also be required.

New England Machinery Market.

BOSTON, MASS., June 1, 1909.

May was a very good month for manufacturers and dealers, the average improvement over previous months of the year being considerable. The prospect for the immediate future is bright, inquiries being numerous and active, though few large lists are out. There is nothing to indicate that the letting up which normally comes with the hot weather will arrive any earlier than usual. Increasing numbers of men are at work. A proof of this is the constantly decreasing amounts of withdrawals from small deposits in savings banks, a fact which bank men consider a sure indication of returning prosperity.

The Southington Mfg. Company, Southington, Conn., has been organized to manufacture automobile kits and tools and to finish automobile forgings. A brick factory, 40 x 125 ft., one and a half stories, will be built near the Southington railroad stations. M. F. Mohr, recently superintendent of the Elmore Tool Mfg. Company, Wethersfield, Conn., will be superintendent.

The Brass Products Company, Southington, Conn., will manufacture electric chandeliers and combination fixtures for tungsten and old style lamps. The business will be located in a factory in Southington, which is now being fitted up for the purpose. James Pratt is president; W. R. Miller, secretary and treasurer, and J. P. Gillette, manager.

The property of the Bullard Automatic Wrench Company, Providence, R. I., has been purchased at auction by John H. Congdon of the Congdon & Carpenter Company of that city, representing creditors. The sale foreclosed a mortgage executed to secure notes given to creditors in February, 1908. The committee of creditors, of which Mr. Congdon is one, proposes to sell the property as soon as possible. It is very doubtful if the wrench business will be continued. It is stated that there is between \$40,000 and \$50,000 worth of property on the premises, including valuable machinery.

The Lockwood Mfg. Company, South Norwalk, Conn., manufacturer of builders' hardware, has awarded the contract for a four-story brick extension to the main factory, 35 x 60 ft., making the structure 210 ft. long.

The Whitney Fixture Mfg. Company, Norwich, Conn., has begun the manufacture of tungsten lamps.

The Aetna Steel Toe Calk Company, Southington, Conn., has begun to manufacture toe and heel calks. Matthew O'Brien is the manager; John Hindley, secretary and treasurer, and William Fletcher, general sales agent.

The Massachusetts Legislature has been asked for an appropriation of \$64,000 with which to furnish and equip the State industrial school at Shirley, which will be one of the reformatory institutions of the State. The equipment will include the machinery usually installed in industrial schools.

The week's announcements of new construction for general manufacturing concerns includes the following: Flint Mills, Fall River, Mass., textiles, additional mill plant of 50,000-spindle capacity; Paul Whitin Mfg. Company, Whitinsville, Mass., textiles, addition to mill, 50 x 100 ft., two stories; Monadnock Mills Corporation, Claremont, N. H., addition to bleachery to give 10,000 sq. ft. manufacturing space; Oxford Mills, North Brookfield, Mass., weave shed, 77 x 180 ft., three stories, and bleach house and storage warehouse, 61 x 154 ft., four stories, of concrete; Westerly Narrow Fabric Company, Westerly, R. I., weave shed, 123 x 157 ft., and boiler house, 25 x 32 ft.; Gardiner, Beardsell

& Co., Nashua, N. H., counters and heels, new building, details not made public; Fisher Mfg. Company, Fisherville, Mass., four-story brick addition. Other concerns which will increase their plants are the Lawrence Mfg. Company, Lowell, Mass., hosiery, \$110,000 addition; Appleton Company, Lowell, dye house; Lowell Textile Company, Lowell, new plant at North Chelmsford, Mass., for the manufacture of toweling; Star Worsted Mills, Fitchburg, Mass.; Greylock Cotton Mills, North Adams, Mass., spinning mill, weave shed and power plant; Aetna Woolen Mills, Watertown, Mass.; Uxbridge Worsted Company, Uxbridge, Mass., mill for dyeing and finishing; Faulkner Mfg. Company, North Bellerica, Mass.; Stoughton Mills, West Stoughton, Mass.; Crocker, Burbank & Co., West Fitchburg, Mass., paper, mills 200 x 250 ft. and 40 x 180 ft.; Smith Paper Company, Lee, Mass.; Emerson Shoe Company, Rockland, Mass., three-story wing; Naushon Company, Central Falls, R. I., textiles; Leader Mfg. Company, Central Falls, silks, new mill; Pawtucket Spinning Company, Central Falls, new plant; Philadelphia Carpet & Rug Works, Gonic, N. H., new mill; Coeneco Mills, Dover, N. H., new mill; Estabrook-Anderson Shoe Company, Nashua, N. H., new factory.

The O. H. Jones Company, East Hartford, Conn., manufacturer of plumbing specialties, has added a brass foundry to its plant at Hockanum. It will be in charge of J. W. Fox, recently with Landers, Frary & Clark, New Britain.

Leslie Moulthrop, receiver of the Dwight Slate Machine Company, Hartford, Conn., manufacturer of machine tools, has been authorized by the Superior Court to sell the company's properties and rights, provided that \$15,000 is realized, a sum which will probably be sufficient to pay the claims against the business.

The Universal Machine Screw Company, Hartford, Conn., has bought 5 acres of land at the north end of the city and will erect a new plant on the site in the near future. Full details of the building are not yet prepared, but it will contain about 40,000 sq. ft. of floor space. No power plant will be installed; power will be supplied from the local electric plant through motors. The company will add to its machine tool equipment later, but no list of machinery has been prepared. The present shop is very busy, the demand both for multispindle screw machines and for screw machine products being large.

The Bridgeport Brass Company, Bridgeport, Conn., is to make large additions to its works this season. A new tube mill will be of brick and steel, 100 x 360 ft., one story; a wire mill will be 60 x 79 ft., four stories, and a power plant, 62 x 65 ft., one story.

The R. L. Morgan Company, Worcester, Mass., has been organized with a Massachusetts charter and authorized capital of \$300,000, to manufacture motor trucks, the design of Ralph L. Morgan. Mr. Morgan is the president, Henry E. Whitcomb treasurer and general manager, F. B. Durfee vice-president, and Alfred R. Grundelle secretary. The large manufacturing building formerly occupied by the Crompton-Thayer Loom Works, has been leased. John R. Back, recently superintendent of the shops of the F. E. Reed Company, will have charge of the production end of the business. It is not the intention of the company to do its own manufacturing, beyond the assembling, the plan being to have the various parts produced under contract by outside parties, from the company's special designs. Mr. Morgan has had a long experience with the automobile and auto truck business, and his associates are men carefully selected for their duties.

The Athol Gas & Electric Company, Athol, Mass., is to improve its power plant at Wendell, Mass., by the erection of a new dam and the establishment of a power house.

Government Purchases.

WASHINGTON, D. C., June 1, 1909.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until June 26 for a 40 ton locomotive jib crane for the Norfolk Navy Yard.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until June 26 for one 1000 and two 1500 kw. turbo-alternators for the New York, Philadelphia and Boston navy yards.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until June 26 for motor generator sets, exciters, switchboard, &c., for the Philadelphia Navy Yard.

The Isthmian Canal Commission will receive bids until June 21, Circular No. 514, for a surface condenser, pumps and other supplies.

The following bids were opened May 24, Circular No. 508, for machinery for the Isthmian Canal Commission:

Class 1.—Two 20-ton locomotive coaling cranes—Bidder 3. American Holst & Derrick Company, St. Paul, Minn., \$13,316; 14. Brown Hoisting Machinery Company, Cleveland, Ohio, \$15,420; 15. Browning Engineering Company, Cleveland, Ohio, \$13,450; 36. Orton & Steinberger, Chicago, Ill., \$12,760; 79. Industrial Works, Bay City, Mich., \$14,600; 85. Ohio Locomotive Crane Company, Bucyrus, Ohio, \$14,500.

Class 3.—Thirteen pneumatic geared air hoists—Bidder 19. Chicago Pneumatic Tool Company, New York, \$2175; 22. Detroit Holst & Machine Company, Detroit, Mich., \$2050; 42. Ingersoll-Rand Company, New York, \$2025; 51. Motley, Green &

Co., New York, \$1686; 54, New Jersey Foundry & Machine Company, New York, \$1694; 61, Shepard Electric Crane & Hoist Company, Montour Falls, New York, \$2230; 68, Tucker Tool & Machine Company, New York, \$1688; 71, Weir & Craig Mfg. Company, Chicago, Ill., \$2080.

Class 4.—Six duplex boiler feed pumps—Bidder 1, Advance Pump & Compressor Company, Battle Creek, Mich., \$1481.10; 23, D'Olier Engineering Company, Philadelphia, Pa., \$1243.50; 27, Fairbanks, Morse & Co., Chicago, Ill., \$1098; 29, Fox Brothers & Co., New York, \$1300.98; 31, Gardner Governor Company, Quincy, Ill., \$1260 and \$1350; 51, Motley, Green & Co., New York, \$1170; 64, Southern Mill Works Company, Chattanooga, Tenn., \$1305; 74, Henry R. Worthington, New York, \$1049.34 and \$1245.96; 80, Jeaneville Iron Works Company, Hazelton, Pa., \$1194; 84, National Electrical Supply Company, Washington, D. C., \$1816.50.

Class 5.—One combination hand and power pipe threading machine—Bidder 7, F. S. Banks & Co., New York, \$247.90; 29, Fox Brothers & Co., New York, \$246.69; 36, Handlon-Buck Mfg. Company, St. Louis, Mo., \$282; 44, Knox & Bro., New York, \$248; 48, Manning, Maxwell & Moore, New York, \$290; 51, Motley, Green & Co., New York, \$270; 68, Tucker Tool & Machine Company, New York, \$250.

Class 6.—One rip saw—Bidder 10, Bentel & Margendant Company, Hamilton, Ohio, \$400; 28, J. A. Fay & Egan Company, Cincinnati, Ohio, \$500; 33, Greenlee Brothers & Co., Chicago, Ill., \$400; 69, Vermilye & Power, New York, \$247.

Class 7.—One automatic cut-off machine—Bidder 6, Bancroft, Ross & Sinclair Company, New Orleans, La., \$650; 10, Bentel & Margendant Company, Hamilton, Ohio, \$400 and \$450; 28, J. A. Fay & Egan Company, Cincinnati, Ohio, \$485; 33, Greenlee Brothers & Co., Chicago, Ill., \$468.

Class 8.—One band saw—Bidder 28, J. A. Fay & Egan Company, Cincinnati, Ohio, \$130; 29, Fox Brothers & Co., New York, \$71.82; 35, Hall & Brown Wood Working Machine Company, St. Louis, Mo., \$128.50; 48, Manning, Maxwell & Moore, New York, \$80; 68, Tucker Tool & Machine Company, New York, \$61.

Class 9.—One post boring machine—Bidder 10, Bentel & Margendant Company, Hamilton, Ohio, \$110; 28, J. A. Fay & Egan Company, Cincinnati, Ohio, \$175 and \$195; 29, Fox Brothers & Co., New York, \$153.52.

Class 10.—One planer—Bidder 10, Bentel & Margendant Company, Hamilton, Ohio, \$200; 11, Berlin Machine Works, Beloit, Wis., \$348.50; 28, J. A. Fay & Egan Company, Cincinnati, Ohio, \$175; 35, Hall & Brown Wood Working Machine Company, St. Louis, Mo., \$210; 48, Manning, Maxwell & Moore, New York, \$135; 51, Motley, Green & Co., New York, \$363; 67, John T. Towsley Mfg. Company, Cincinnati, Ohio, \$275; 68, Tucker Tool & Machine Company, New York, \$198 and \$194.

Class 11.—Two reversible wood boring machines—Bidder 19, Chicago Pneumatic Tool Company, New York, \$188.57; 20, Cleveland Pneumatic Tool Company, Cleveland, Ohio, \$178; 40, Independent Pneumatic Tool Company, Chicago, Ill., \$189.60.

Class 12.—One jointer—Bidder 10, Bentel & Margendant Company, Hamilton, Ohio, \$220; 11, Berlin Machine Works, Beloit, Wis., \$190.01; 28, J. A. Fay & Egan Company, Cincinnati, Ohio, \$175; 29, Fox Brothers & Co., New York, \$139.44; 33, Greenlee Brothers & Co., Chicago, Ill., \$210; 35, Hall & Brown Wood Working Machine Company, St. Louis, Mo., \$149; 48, Manning, Maxwell & Moore, New York, \$125; 51, Motley, Green & Co., New York, \$198.75; 55, Oliver Machine Company, New York, \$153, \$209, \$243 and \$234; 67, John T. Towsley Mfg. Company, Cincinnati, Ohio, \$145; 68, Tucker Tool & Machine Company, New York, \$165.

The following bids were opened May 25 for machinery for the navy yards:

Class 61.—One concrete mixer—Bidder 72, Chicago Concrete Machinery Company, Chicago, Ill., \$900; 172, Municipal Engineering & Contracting Company, Chicago, Ill., \$1210; 209, Ole K. Olsen, New Orleans, La., \$1125; 227, Ransom Concrete Machine Company, Dunville, N. J., \$950; 251, Standard Scale & Supply Company, Chicago, Ill., \$600.

Class 61.—Four complete sets of propelling machinery—Bidder 7, Atlantic Company, Amesbury, Mass., \$601.76; 44, Chesapeake Gas Engine Company, Hampton, Va., \$496; 110, Grey Motor Company, Detroit, Mich., \$464; 163, Lackawanna Mfg. Company, Newburgh, N. Y., \$155.60; 166, Murray & Frerethen, South Boston, Mass., \$305; 274, Tasker & Strobbridge, Philadelphia, Pa., \$162.50.

Class 91.—One condensing equipment—Bidder 84, M. T. Davidson Company, Brooklyn, N. Y., \$1135; 139, Jeaneville Iron Works, Hazelton, Pa., \$1290; 185, Manning, Maxwell & Moore, New York, \$1121; 283, Union Steam Pump Company, Battle Creek, Mich., \$986; 286, Vermilye & Power, New York, \$1060; 291, Wheeler Condenser & Engineering Company, Carteret, N. J., \$1097; 304, C. H. Wheeler Mfg. Company, Philadelphia, Pa., \$998; 309, Henry R. Worthington, New York, \$1043 and \$1013.

The following bids were opened on May 20 for a hoisting derrick for the United States Penitentiary at Fort Leavenworth, Kan.:

Fisher Machine Works Company, Leavenworth, Kan., \$219; G. & W. Mfg. Company, New York, \$273; National Equipment Company, Chicago, Ill., \$275.20; Victor R. Browning & Co., Cleveland, Ohio, \$345; American Hoist & Derrick Company, St. Paul, Minn., \$438.24.

Bids for an air pump for the tender Sequoia were opened on May 12, by the Lighthouse Engineer, San Francisco, Cal., as follows:

E. W. Tucker & Co., San Francisco, Cal., \$510; Moore & Scott Iron Works, San Francisco, Cal., \$615; Geo. E. Dow Pumping Engine Company, San Francisco, Cal., \$649; United Engineering Works, San Francisco, Cal., \$709 and \$748.

Under bids opened May 15, the Downey & Kruse Company, Milwaukee, Wis., has been awarded contract for boiler and engine with air compressor, riveting hammers, &c., for the White Shoal, Mich., Light Station, at \$635.

Under bids opened April 21, Circular No. 500, for machinery for the Isthmian Canal Commission, Fox Brothers & Co., New York, have been awarded class 69, two rail benders, \$190.

Under bids opened May 4 for machinery for the navy yards, Vermilye & Power, New York, have been awarded class 92, one single-stage motor driven centrifugal pump, \$795.

The Struggle of the Molding Machine.

C. R. McGahey, Richmond, Va., who has done foundry engineering all over the United States, writes as follows with regard to the use of molding machines:

The struggle of the molding machine has been one almost without an equal. No uniform results have been obtained from its use in union foundries, the day's work always being agreed upon between the workmen and the machine operator. Boys have been tried as operators on a premium system, but only to be weeded out after a short time. A few good days' work would be done and then something was wrong or the machine would break. Not only does this prejudice exist in organized shops but in partial union shops. I have seen cases where the machine was operating in one department and helpers would be sent at intervals to this department to see just how fast the machine was doing the work, actually counting the flasks and noting the time.

The better way in introducing the machine is to have a contract with the company selling the machine to furnish an operator to start the machine and turn out a certain production on a given casting with a stipulated loss. The influence of the molders' prejudice will be more keenly felt when the company undertakes to place machines in the shop than at any other time. Many men feel that the machine is a direct menace to them and do all possible to prevent its successful operation. However, the machine, both automatic and semiautomatic, is fast coming into use, and these prejudices might as well be dropped.

The foundry engineer who installs machines is the man who has to stand the brunt, and he should be well paid for his undertaking. In the first place, he instructs an operator, and soon this operator finds that he has his day's work up at 11 o'clock and has to find some fault with the machine. Something is loose or dead wrong as soon as a good floor is set out, and from this time on no speed can be made. Now these influences are certainly trying on the company as well as the engineer who has attempted to install the equipment, and I believe the best solution is to make a combine from the various shops to let out certain work to be made on machines. A number of concerns should own this plant, which would have nothing but machine equipment, with no one allowed to work in the place except machine operators on a piece work basis. This will bring around the desired results. This will cut down the shops where the machine is much opposed by their letting out so much casting work that is to be made strictly on a machine, and each one of these shops to own, say, an equal stock in the machine molding shop.

This will make a specialty of the process, and the whole situation will then change and many shops will want the machine in their possession in order to "keep their men in a job." The machine will never be a success unless some step of this kind is taken for its protection and future welfare. The use of the machine in many shops has been abandoned from failure coming purely from influences of the exact nature cited above. It also has happened that while the castings in all instances are more accurate when made on a properly operated machine, we will have a complaint from the machine shop where such castings have to be machined. The objection has been so strong that the finishing man has gone so far as to condemn some hand made castings by mistake, showing that the whole influence was on machine made castings. The statement is made in *The Iron Age* that the molding machine can never be fully developed as it should be under union control; this is true from a practical point. A continued experience from 1886 to the present time warrants the writer in upholding this statement. The machine must come into use; the progress of the age demands its installation and use, and the workmen might as well yield and decide to make it a go. It will do the work; it is doing the work, and if we cannot operate the machine in our home shops we will have to organize special machine operating foundries and let out much of our work to such shops and all become common stockholders in those plants.

HARDWARE

TARIFF discussion brings out from time to time many points of interest apart from the immediate subject under consideration. Any important question, indeed, reaches out in many directions and touches varied interests. The retail merchants of the country thus come in for a share of criticism in the halls of Congress because of their supposed or actual relation to trade conditions which have to be taken into account in legislating in regard to the tariff. For example, recent discussions brought out the sweeping charge against retail merchants that they are selling goods at extortionate prices and making exorbitant profits at the public expense. Instances were given of the sale of articles in the line of Glassware at four or five times their cost and of China-ware and even Cutlery on which an excessive profit was charged. On the basis of such facts or alleged facts the retail distributors of the country were held responsible for certain high prices which the public is compelled to pay.

It is scarcely necessary to point out the groundlessness of these charges so far as the Hardware trade is concerned. The accusation does not indeed hold at all generally against the merchants in any line of business. Competition cuts down profits and regulates prices. Many merchants doubtless sell small goods of trifling value at a percentage of profit they would never think of asking on a higher priced article, taking the view that the few cents realized on the sale does not more than cover the time involved in effecting it. Thus we may suppose the price was made 5 cents, when it would have been possible on the close figuring applied to the stock in general to have sold the article for 2 cents. There may well be difference of opinion in regard to the wisdom of these relatively high prices, but it is certain that in the Hardware trade they are the exception and not the rule. Hardware in general is held at a narrow margin of profit. There are no doubt multitudes of instances in which the merchants do not receive an adequate return for their investments, because they fail to take into account the cost of carrying on their business and consequently sell many articles at an actual loss. This, as we have recently pointed out, is notably the case in regard to the sale of Agricultural Implements. If there were a disposition on the part of distributors to charge unreasonable prices the law of competition, remorseless but beneficent, would take care of the public. The man who attempts to make excessive profits will lose his customers, and unless he mends his ways will have to go out of business.

This matter, so far as it relates to the manufacturer, is very happily and forcibly touched upon in the admirable address of Robert Garland, the president of the American Hardware Manufacturers' Association. This address was delivered at the recent meeting of the National Retail Hardware Association, but is deserving a wider audience, and we, therefore, print it in full. It takes a broad view of trade questions. While it defends the retail merchant from the charge of making exorbitant profits it enunciates the correct principles in regard to the manufacturer's position, and at the same time it defends them from accusations sometimes brought against them as making great profits and becoming rich at the public expense. But while stating the position of the

manufacturer in a clear and dignified manner, and recognizing the fact that competition is, after all, the great regulator of prices, the supreme importance of maintaining quality in the product is emphasized, and an earnest plea made for harmony between the producers and distributors of Hardware products.

Condition of Trade.

The striking feature of the market at this time is the manner in which there is an improvement in the general situation, notwithstanding the unsettled state of things in connection with tariff revision. The country apparently is going ahead in the direction of renewed prosperity, without waiting for the revised tariff, and, indeed, while uncertain what action will be taken by Congress in this matter. A part of this apparent indifference to what is going on at Washington is the growing conviction that no drastic action is to be anticipated and that care will be taken that existing manufacturing interests are not disturbed by any radical revision of duties. Among other influences which are helping the commercial situation in all parts of the country is the fact that the gradual work of getting things in shape again has been going on steadily, with economies on the part of all classes—producing, distributing and consuming—until there is need of replenishing stocks and a disposition to take hold of business and industrial activities with renewed enterprise. The state of things in the iron market has also its good effect, not only on the trades with which our readers are specially concerned, but with the public at large, with whom iron still serves as a commercial barometer. The approach of harvest, with the prospect that there will be the usual enormous contribution to national wealth from the crops, is unquestionably a potent factor and does not a little to encourage a decidedly hopeful feeling. Meanwhile the Hardware market is showing increased activity. The state of things in Wire and Wire Nails is indicative of the confidence entertained by the merchants. There is a good deal of buying in lines which are regarded as desirable purchases. At the same time the Hardware market as a whole is not especially strong. As a rule prices are ostensibly about where they have been for some time, with occasional evidences of hardening here and there. Manufacturers, however, are anxious for business. Definite orders would doubtless in many cases command very favorable prices, as concessions are often made beyond what appears to be the established price. It is a condition of things which calls for especial knowledge, care and judgment on the part of those charged with the responsibility of placing orders for considerable quantities of goods. The impression prevails among some well informed persons, whose judgment is entitled to weight, that the present is a good time to contract for future needs, provided it is done with requisite care and in lines in which the declines in values have gone to a point from which there should be a recovery if the present trend toward improved conditions continues.

Philadelphia.

SUPPLER HARDWARE COMPANY.—The underlying conditions which made us sanguine and rather optimistic two weeks ago continue to improve. The threatened coal strike among anthracite workers has been averted, and the men have accepted a three years' extension of their

present agreement. This was almost a foregone conclusion among merchants through the hard coal regions, many of whom continued their purchases and kept their stocks full, feeling that the strike would not occur. The mining companies, however, had accumulated a vast supply of fuel, and were better prepared than ever to discontinue mining throughout the entire summer. The various railroads and mechanical plants dependent upon this supply had adopted the same policy, and this, together with the fact that there was a surplus in the labor market, made the men willing to listen to reasonable counsels.

There seems to be a disposition on the part of the railroads to loosen up a bit, the Baldwin Locomotive Works having received an order from the Harriman roads for 105 locomotives, which, together with several smaller orders, seems to indicate that the worst is over.

A new tie between this port and the great Southwest was formed by the sailing of the first ship of the new Philadelphia & Gulf Steamship Line, plying between Philadelphia and New Orleans. The new line has already increased competition, causing the Southern Steamship Company to announce the running of several of their ships between this port and New Orleans and Galveston. Freight rates are now abnormally low, and shipments are being made through this port for Texas points as far west as Cleveland and Indianapolis.

One other indication that summer is here is the vacation list prominently posted, and the growls of the younger fellows who are compelled to vacate during June, the older employees naturally being given a chance to express their preference for absence during July or August. The opportunity to go first, however, is not without its advantages, as it prepares the Hardwareman for the double duty he is likely to perform during most of the summer season. It is only by a comparison of the actual figures that one can be convinced that the Hardware business is not most active during vacation season.

Boston.

BIGELOW & DOWSE COMPANY.—The volume of business for the month of May has been good and shows a handsome increase over that of last year.

The reduction of the price of Wire Nails, &c., the first of the month came as a surprise, as it was thought the reduction would be held back until June at least. Most of the country merchants had stocks bought at all prices and the decline was not pleasing, coming as it did in the middle of their spring trade. They had hardly made up their minds as to the wisdom of the decline when the advance was announced. Their belated orders were refused at the mills, and, taken altogether, the majority of dealers have been badly disgruntled, while the small minority have specified for Nails which are being shipped more promptly than they can care for them and much faster than dealers had reason to believe would be possible.

While the decline had a depressing effect on general business until the middle of the month, the advance gave confidence in the stability of the market and the improvement has been marked. It is now generally conceded that steel products are firm and prices will continue to advance. The Copper market is much firmer and all conditions are favorable for increased business in the future.

New England cotton mills are investing over \$54,000,000 this year in new mills and machinery. While the coarse goods can be made in the South, New England still controls the manufacture of the finer goods.

Our weather conditions have been cold and wet, which favor the growing crops.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—The activity in Iron and Steel Wire products has proved a continuous performance. This has not proved a flash in the pan or on the order of something resolute, but evidently a pronounced *volte face* done in the most approved military style. The maneuvers of the coming summer will have nothing to show surpassing it, we are confident. May and June are not months to show great volume, but

at last the comparison has become not quite so deadly with '07. Everybody is talking improvement, betterment, big orders and full prices. Even the Tariff discussion is left pretty much to the cartoonists of the daily press for interest and exploitation.

A singularly frank confession was made by Senator Heyburn in declaring that the plank calling for the tariff reform was inserted in the Republican platform when the Republicans were frightened. Surely this is only a parody on the old lines of "the Devil was sick," &c. Fortunately we have a President who was educated in political economy in the good old school of Yale, and it is not unlikely that his veto fist will come down on any measure flagrantly out of the way, or drawn so as to violate promises made before election. Otherwise where would we be when "frightened" next time? We shall have good cause to fear only if we act in bad faith.

There is a singular feature connected with the matter of importations and revenue in their mutual relations. We are urged to cultivate home industries, to build them up so as to be independent of the foreigner. As soon as we show ourselves independent by dropping the prices importations fall off and revenue necessarily shrinks. Then we pour forth lamentations over that particular situation because we have not money enough to spend in building Dreadnoughts and the like. When the tide turns we begin to get more material from abroad—just what we were deprecating a while since—and we rejoice over the increased revenue. That means money for the billion dollar Congresses.

Which is the most to our advantage, home products and smaller revenue from imports, or larger imports with the ready money they bring?

Cleveland.

W. BINGHAM COMPANY.—Signs of increasing prosperity are quite in evidence in all lines of business. The general situation in reference to all commodities seems to be hardening every day. There certainly is a better feeling in the steel situation and other lines are in good demand. It is reported that the New York Central Railroad Company and its allied lines handled during the month of April of this year 280,000 more loaded freight cars than they did a year ago the same month, and the traffic offered and in sight on these same lines for the month of May, it is said, will beat this record. Surely this is a very encouraging sign and goes to prove what we have all thought must come to us—return of prosperous times in a large measure.

The tariff discussion in Washington is giving the trust busters a fine time to talk and exploit their ideas, and the public is beginning to open its eyes and ears and listen to a good deal of their talk. Heretofore, the public was led to believe that the trusts were confined mainly to the manufacture of steel, sugar, oil, tobacco and a few other lines. Now one Senator charges the lumber trust as the greatest monopoly; another one charges that the farmers are bound to get advanced prices. So it goes. Senators from one section have commodities that they are bound to protect to the fullest extent, and they do not seem to care what protection is given other sections. It will be a happy time for the country when the tariff agitation is closed, for there is an immense amount of business that is being hung up anxiously awaiting the decision of Congress.

We can see a little improvement every day in trade conditions. Every dealer when he buys seems to be in a hurry for his goods. Those who are well organized to take care of the trade promptly are running their shops to almost the fullest capacity. Spring goods are going forward in good volume in all lines. Trade in general is quite satisfactory.

Prices for the most part are steady at present, but the outlook is for an advance on many lines of goods, as they have been altogether too low. Manufactured Hardware, especially House Trimmings, can stand a little push up in price. They have been too low considering the labor, also the material these commodities are made of. We believe at present prices they are a good purchase, not only for the retailer, but for the consumer.

It is reported there has been quite an advance in

Manila and Sisal Hemp. Undoubtedly this will advance the price of Rope, and those of our customers (and there are many of them) who bought early at the low price at which Rope was offered by the jobbers will be greatly benefited.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—Business in the month of May was not quite up to the standard for this month, but was much better than in May, 1908. May and June are months in which we do not expect very much in good times and are not disappointed when trade is a little dull in an off year. Prospects for business seem good. The vegetable crop in this section is excellent. Strawberries, raspberries and early vegetables are now coming on the market and bringing good prices, and the supply seems abundant. The hay crop is unusually heavy and the wheat is looking fine. Take it altogether, conditions which have heretofore produced good business are present with us, and inasmuch as there is a gradual improvement in business and the market on steel and iron products is improving, we are encouraged to believe that our fall business is going to grow better each month as the season advances, and that when the business for the approaching season is rounded up we will all feel that we have had our full share of prosperity. The Hardware merchants seem to have confidence in the present market, and the advances are being fairly well maintained. Collections are about as usual at this season of the year.

Baltimore.

CARLIN & FULTON.—In our nearby sections trade during May has been quite active, building operations have been quite extensive, weather conditions generally good for outdoor work, and the prospects for a wheat crop most excellent. There has also been considerable speculation in Wire Nails, resulting in an active demand for them; but it is possible that this will be followed by a corresponding dullness in that special line unless consumption is increased by the low prices which were made and which, even after the advance of May 15, are still low.

According to our experience, we are now about to enter upon the dullest period of the year, and the stability of prices is generally tested by the lack of demand during the months of June and July.

It can now be but a very little while before the tariff bill is completed, and the manufacturers will know positively what effect there will be upon their raw material. The changes as affecting the Hardware trade are of a very trifling character, and not enough to affect business in the least.

All indications point toward a good trade during the coming season after the midsummer dullness, and unless some disasters happen to the growing crops there will be a most excellent trade in every section of our country.

St. Louis.

NORVELL-SHAPLEIGH HARDWARE COMPANY.—We are in the midst of our dull summer season. May and June are the dullest months in the Hardware business in St. Louis, but even they are only comparatively dull, because, on account of the very fortunate location, the trade of St. Louis jobbers is remarkably even all through the year, Southern trade beginning six weeks or two months earlier than the Northern and Western trade and gradually decreasing by the time business is improving in the other sections, thus making a very even business all during the year.

Trade is good. Collections are good. Conditions are good, having improved very materially in the South and Southwest in the last two weeks, as the heavy drought in these sections has been broken by much needed rains.

Confidence seems to have returned—witness the advance in the price of United States Steel common stock—but it has returned somewhat in advance of actual business, which is reviving, in a general way, much more slowly than had been hoped; still it is reviving.

Conditions for business this fall are extremely bright and if the promise which now exists is fulfilled we expect to work a good many nights.

Convention season in the South is about finished. Reports from the conventions that have been held indicate retail associations in the several States are growing prosperous, that a very live and enthusiastic interest is being taken in the work, and that the members have concluded the return for their time and money spent is many-fold. We wish them continued prosperity.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—May business has been very similar to May, 1908, and may fairly be considered normal. The orders have shown that they were designed to cover actual wants, and it is evident that the stocks in hands of the retail merchants are not large and will frequently need to be replenished.

The weather conditions have been quite favorable for the growth of small grain and grass, but a little cool and moist for corn. There is sufficient time, however, for corn on ahead.

Upon the whole, the outlook in the Northwest is very satisfactory. The demand for Nails and Wire has increased some since the changes in price. The changes in prices on Hardware generally have not been beyond expectation and there is now growing up a feeling of confidence in the market and also a feeling that business promises to grow more satisfactory as the year advances. This will probably be the case at least until the crops have reached the stage that will enable the trade to see about what may be expected.

Collections are about as usual.

New Orleans.

WOODWARD, WIGHT & Co.—We continue to show gains over last year. Our trade conditions are barely normal and not oversatisfactory. The orders are small, showing a conservative spirit and the buying only of what is absolutely necessary for the present. Weather conditions have been entirely favorable for the growing crops and abundant rain for the last two weeks in the sugar territory has made conditions very much better with the sugar planters. Reports from the section show crop to be in splendid shape. The long wrangle over the sugar schedule in the tariff discussion resulting in a direct vote yesterday in favor of the present sugar duties, is also a source of gratification to the sugar planter. While the matter is not definitely settled, the votes taken on this schedule, both in the House and Senate, indicate more friends for the present schedule than against it.

Cotton conditions are not as bad as were feared. While the boll weevil has made his appearance in two or three parishes, it has not been heard from so far in sections where it was expected to do considerable damage. It looks as if some planters were unnecessarily frightened. If present conditions continue 60 days longer and with the present market price of this staple, a great many planters and cotton merchants are going to be very agreeably surprised.

Conditions in the lumber industry are dragging. There is no spirit to the trade, although prices have been at a point where they cannot go any lower. Lumber yards and dealers, however, all over the country have been holding off buying lumber, and their stock will become so depleted that a change for the better is imminent, and when the buying demand does come into play it will be large and continue for a good long time.

Bank deposits show large gains and money seems to be plentiful with all of the smaller country banks as well as larger banks in the main cities. Collections are reported good in all directions, and while general trade is quiet, the feeling is hopeful and an increase of business is to be looked for on the least provocation.

Portland, Oregon.

FAILING-MCCALMAN COMPANY.—Conditions in the Pacific Northwest continue to be excellent. Our crop prospects as a whole are very good, and we are looking for a satisfactory price. Our collections have been excellent so far this year, and with the high prices now being obtained for the products of the surrounding country we hope that they will improve.

NOTES ON PRICES

Wire Nails.—The Nail market continues in a satisfactory condition and prices are firm at the recent advance. Demand, which was phenomenally heavy during the two weeks of low prices, has naturally diminished since the advance, but orders are being received by the mills in good volume, indicating the confidence of the trade and the improved conditions which prevail. Some delay is reported in shipments, but not enough to occasion much inconvenience. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$1.70
Carload lots to retail merchants.....	1.75
Less than carloads to jobbers.....	1.75
Less than carloads to retail merchants.....	1.85

New York.—Local business has been moderate during the week with no marked changes in market conditions. Small lots at store are held at \$1.95 per keg, base, with \$1.90, base, procurable in some instances.

Chicago.—After a month of heavy demand, in which the tonnage of Wire Nails placed during the first two weeks was probably the largest ever recorded in a like period, trade has slackened and new buying is now comparatively light. With the business already booked and what is still coming in the mills will be kept busy for the next 60 days or more at full capacity in executing orders. Shipments, which are now fairly prompt, are likely to be subject to some delay a little later, but not to an extent that will occasion much inconvenience, unless current consumption increases in unexpected ratio. The present schedule of \$1.70, Pittsburgh, is said to be firmly maintained by all the leading mills. We quote as follows: \$1.88, Chicago, in car lots to jobbers, and \$1.93 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—The large trade had pretty well covered its requirements for Wire Nails for some time ahead prior to the recent advance of 10 cents per keg in prices of Wire Nails, and, as a natural result, new orders fell off to some extent, but we are advised that new business coming into the mills is still heavy. Shipments by the mills in May were a record breaker, being much heavier than in any one month in the Nail trade for a very long time. Reports were current that prices of Wire Nails would be advanced again, effective June 1, but this proves to have been untrue, and we are advised that no immediate change in prices is contemplated by the leading Wire Nail producers. Some consumers were dilatory in covering their requirements, but have come in since the advance was made and have placed good sized orders for shipment at convenience of the mill. The leading makers of Wire Nails are filled up with orders for the next several months, and the American Steel & Wire Company is so rushed with business that it operated its Wire Nail plants in the Pittsburgh district on Monday, May 31, Memorial Day. Prices on Wire Nails are very firm on the basis of \$1.70 per keg in carloads and larger lots, f.o.b. Pittsburgh.

Cut Nails.—Some improvement is reported in specifications on contract orders, but new orders are confined to nearby requirements. The market still lacks strength, as concessions of 10 to 15 cents per keg are made from the regular quotation of \$1.80 per keg, base, f.o.b. Pittsburgh, for carload lots.

New York.—A comparatively light volume in demand characterizes this market. Cut Nails are held at \$1.85 to \$1.90 per keg, base, for small lots at store.

Chicago.—Cut Nail prices are nominally unchanged, but owing to the advancing cost of steel scrap prices are somewhat firmer. To a limited extent the movement in Cut Nails was accelerated by the recent activity in Wire Nails, but the car shops, which are the heavier purchasers, are still buying sparingly. We quote as follows: In car lots, to jobbers, Iron Cut Nails, \$2; Steel Cut Nails, \$1.80.

Pittsburgh.—From certain sections of the country, especially from Southern points of consumption, a some-

what larger demand for Cut Nails is reported, but the general market is quiet, orders being placed mostly to cover only current needs. Consumers are specifying more freely than for some time, and shipments of Cut Nails by the mills are heavier. We quote Cut Nails nominally at \$1.80 per keg, base, f.o.b. Pittsburgh, but this price is still being shaded from 10 to 15 cents per keg.

Barb Wire.—Owing to the backwardness of the season, fencing is still being built in some sections, which results in new business being received by the mills later than usual. Specifications against contract orders are in good volume and shipments from mills are heavy. At the recent advance quotations are as follows, f.o.b. Pittsburgh:

	Painted.	Gal.
Jobbers, carload lots.....	\$1.70	\$2.00
Retailers, carload lots.....	1.75	2.05
Retailers, less than carload lots.....	1.85	2.15

Chicago.—New demand for Barb Wire is tapering off and comparatively few orders are being entered. Buying for the spring season is practically over, so far as the Southern trade is concerned. It is ordinarily concluded by this time in Northern territory as well, but owing to the lateness of the season a moderate amount of new business is still coming from the Northwest. Heavy shipments against orders already booked are going forward and the mills are from a week to 10 days behind with shipments. Prices now ruling are those established by the recent advance of \$2 a ton, which are as follows: Jobbers, Chicago, car lots, Painted, \$1.88; Galvanized, \$2.18; to retailers, car lots, Painted, \$1.93; Galvanized, \$2.23; retailers, less than car lots, Painted, \$2.03; Galvanized, \$2.33; Staples, bright, in car lots, \$1.88; Galvanized, \$2.18; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—The advance of \$2 a ton, effective on May 15, has checked new demand for Barb Wire to considerable extent, but this was anticipated by the mills, which are filled up for the next several months on contracts taken before the advance was made and against which buyers are specifying very freely. It is evident that the stocks of the trade were not fully satisfied before the advance in prices was made, as many new orders are still coming into the mills and at the full price. Shipments of Wire in May by the leading mills were very much heavier than in any previous month for a long time. We quote \$2 for Galvanized and \$1.70 for Painted, f.o.b., Pittsburgh.

Plain Wire.—Demand is light as compared with that during the period before the recent advance, but specifications against contracts are being received in good volume by the mills. Quotations per 100 lb. to jobbers in carload lots are as follows, on a basis of \$1.50 for Plain and \$1.80 for Galvanized, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, the usual price to retailers being 5 cents additional:

Nos.....	0 to 9	10	11	12	12½	13	14	15	16
Annealed.....	\$1.50	1.55	1.60	1.65	1.75	1.85	1.95	2.05	
Galvanized....	1.80	1.85	1.90	1.95	2.05	2.15	2.25	2.35	

Chicago.—Reflecting conditions governing the demand for Barb and other Fence Wire, new buying in Plain Wire has slowed up and is relatively high. Heavy shipments against the orders taken at low prices are being made. The prices now effective are based upon the advance May 15 of \$2 a ton, which we quote as follows: Car lots, to jobbers, \$1.68, base, f.o.b. Chicago.

Pittsburgh.—As generally anticipated, the advance of \$2 a ton in Plain Wire, which went into effect May 15, has checked demand to some extent, but the mills continue to receive fairly large orders, while specifications against contracts are coming in very freely. We quote Plain Wire at \$1.50 and Galvanized at \$1.80, f.o.b. Pittsburgh, 60 days, or 2 per cent for cash in 10 days, 5 cents additional being charged the retailers in smaller lots.

Augers and Bits.—There is a better feeling in the market for Augers and Bits, and the manufacturers have recently made an advance of about 5 per cent.

Galvanized Ware.—This market, to the irregularities of which we have repeatedly called attention, has been during the past week or two in a somewhat demoralized

condition. Lower prices have been developed by the very active competition which prevails between some of the manufacturers, but there are others who are pursuing a more conservative course, refusing to meet extreme quotations. It is understood that there have been some efforts made to correct this state of things, but, while conferences have been held, the general situation remains as above.

Tinware.—There is a good deal of unevenness in the prices of Tinware, and the market is not in a settled or satisfactory state. Some of the manufacturers are reported to be making rather close figures to comparatively small buyers, and there is a good deal of competition for business in sight.

Steel Express Wagons.—The competition between the manufacturers of these goods, which for a minor line have made for themselves a fairly prominent place in the trade, is at present decidedly active. As a result prices are lower, and with an unusual difference in the quotations of the several manufacturers. This is a market in which careful buyers should be able to place orders advantageously if they sound the market judiciously.

Lamp Chimneys.—The leading interest in Lamp Chimney manufacture has made an advance, averaging approximately 5 cents per dozen, on lime and seconds Lamp Chimneys.

Telephone and Telegraph Wire.—The list of Telephone and Telegraph Wire, which appeared in our issue, May 27, was that of May 5 and not May 19, as stated. The list, given herewith, shows an advance of $\frac{1}{8}$ cent per pound and became effective May 19:

					List prices in cents per pound.		
Dia. in	Bdls. per	Weight in	Weight in	Sizes	B. B.	B. B.	Steel.
dec. of	an inch	per	pounds per	per B. W.			
an inch	mille.	mille.	M. feet.	gauge.			
.203	3	590	112	6	4 $\frac{1}{2}$	3	2 $\frac{3}{4}$
.165	2	390	74	8	4 $\frac{1}{2}$	3	2 $\frac{3}{4}$
.148	2	314	60	9	4 $\frac{1}{2}$	3	2 $\frac{3}{4}$
.134	2	258	49	10	4 $\frac{1}{2}$	3 $\frac{1}{2}$	2 $\frac{3}{4}$
.120	2	206	39	11	4 $\frac{1}{2}$	3 $\frac{1}{2}$	2 $\frac{3}{4}$
.109	2	170	32	12	4 $\frac{1}{2}$	3 $\frac{1}{2}$	3
.083	2	99	19	14	4 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$

Less than 1500 lb. take $\frac{1}{4}$ cent per pound advance. Sizes 8 to 14 inclusive, in $\frac{1}{2}$ -mile coils. Size 6 in $\frac{1}{4}$ -mile coils.

Paris Green.—The demand has been light from potato growing sections of the country, owing to the backward weather. Some merchants are reported to have carried over considerable Green from last season, which cost about 4 cents per pound advance on this year's prices. Their policy will probably be to work off these stocks and then purchase in small quantities to supply their trade. No change has taken place in prices, and some manufacturers are of the opinion that there will be none. The schedule for Arsenic Kegs is as follows, f.o.b. New York; terms, 30 days, or 1 per cent. 10 days; if f.o.b. Chicago, add $\frac{1}{2}$ cent per pound:

	Per pound.
On orders of 10,000 lb. or over.....	17 c.
5000 or over but less than 10,000.....	17 $\frac{1}{2}$ c.
1000 or over but less than 5000.....	18 $\frac{1}{2}$ c.
500 or over but less than 1000.....	19 $\frac{1}{2}$ c.
Less than 500 lb.....	20 $\frac{1}{2}$ c.

The extras are as follows: Kegs of 100 to 175 lb., $\frac{1}{2}$ cent per pound extra; Kils, 14-28-56 lb., 1 $\frac{1}{2}$ cents extra; Boxes, 2 to 5 lb., paper, 2 cents extra; Boxes 1 lb. paper, 3 cents; Boxes, $\frac{1}{2}$ lb. paper, 4 cents, and Boxes $\frac{1}{4}$ lb. paper 5 cents per pound extra.

Copper Wire.—Bare Copper Wire for electrical purposes, carloads, mill shipments, was advanced another $\frac{1}{4}$ cent per pound May 28 to 14 $\frac{3}{4}$ cents, less than carloads being quoted at 14.8-10 cents per pound, base.

Window Glass.—The demand is exceedingly light and production is far in excess of requirements. That there is enough Glass in the hands of manufacturers to supply requirements for some months to come is regarded as a conservative estimate. Indications are that a number of hand operated plants are arranging to run during the summer, but what the machine factories will do in this regard is not yet known. Complaints are reported from jobbers at the poor quality of Glass turned out by manufacturers in the desire to produce quantity. Factory prices are said to be the lowest of the year owing to ex-

cessive competition, and there seems to be little inducement, if any, for jobbers to stock up. The following discounts may serve as some guide to the market: For Greater New York, from jobbers' list, October 1, 1903, 90 and 35 per cent. discount on Single and 90 and 40 per cent. discount on Double Strength Glass. Outside Greater New York discounts are 90 and 40 on Single and 90 and 45 on Double. The American Window Glass Company's discounts on Machine Made Glass, from manufacturers' list, January 1, 1901, are 90 and 40 per cent. on Single and 90 and 40 and 10 per cent. on Double. No orders are accepted by this company for shipment later than July. Hand operated factories are supposed to be meeting the discounts quoted by the American company, and perhaps shading them in some cases.

Rope.—According to advices, about a half of the current crop of Sisal Hemp was recently purchased in the Mexican market, and the larger portion of this purchase was subsequently sold to a manufacturer of Binder Twine. Under these conditions the price of Sisal Hemp has rapidly advanced, and Manila Hemp has also advanced in sympathy, but to a less extent. During the latter part of May some manufacturers cut the price of Manila Rope from $\frac{1}{4}$ to $\frac{1}{2}$ cent per pound, but later this cut was withdrawn. The higher prices of Hemp have resulted in advances in Rope, but the market is somewhat unsettled and there is a lack of uniformity in quotations of the various manufacturers. Demand for Rope has shown an increase, with the probability of higher prices. The market may be represented by the quotation of 8 $\frac{1}{2}$ to 8 $\frac{3}{4}$ cents per pound, base, for Pure Manila Rope of the highest grade, and a corresponding quality of Sisal Rope at 8 to 8 $\frac{1}{2}$ cents. Lower grades of both kinds of Rope can be purchased at $\frac{1}{4}$ to $\frac{1}{2}$ cent less than the foregoing quotations. Jute Rope, $\frac{1}{4}$ in. and up, No. 1, is quoted at 6 $\frac{1}{4}$ to 6 $\frac{1}{2}$ cents, and No. 2 at 5 $\frac{1}{4}$ to 5 $\frac{3}{4}$ cents.

White Lead in Oil.—While no advance has been made in the price of White Lead in Oil, the strength of the Oil market and higher prices of Pig Lead has resulted in making prices for Lead in Oil firm. Quotations are as follows: In 100, 250 and 500 lb. kegs, 6 $\frac{3}{4}$ cents per pound; in 25 and 50 lb. kegs, 7 cents per pound, with the usual advances on smaller packages.

Linseed Oil.—The Oil market continues strong, owing to the belief that all available seed has been purchased by crushers and that there is comparatively little Oil in crushers' tanks. A number of the mills have closed for want of seed. Buyers would not be surprised at higher Oil prices as the season advances. Quotations for 5-bbl. or more are as follows: State and Western Raw, 58 cents per gallon; City Raw, 59 cents per gallon, with the usual advance of 1 cent for less than 5-bbl. lots. Boiled Oil, 1 cent advance on Raw.

Spirits Turpentine.—The local market has held steady at former quotations, with a fairly good demand. It is represented by the following quotations: Oil Barrels, 41 $\frac{1}{2}$ to 42 cents; Machine Made Barrels, 42 to 42 $\frac{1}{2}$ cents per gallon. Announcement is made in the daily press of the formation in Texas of the Western Naval Stores Association, for the mutual benefit and promotion of the industry so far as these ends can legally be achieved by compiling correct statistics as to the acreage cupped, the State crop, &c.

United Brush Manufactories.

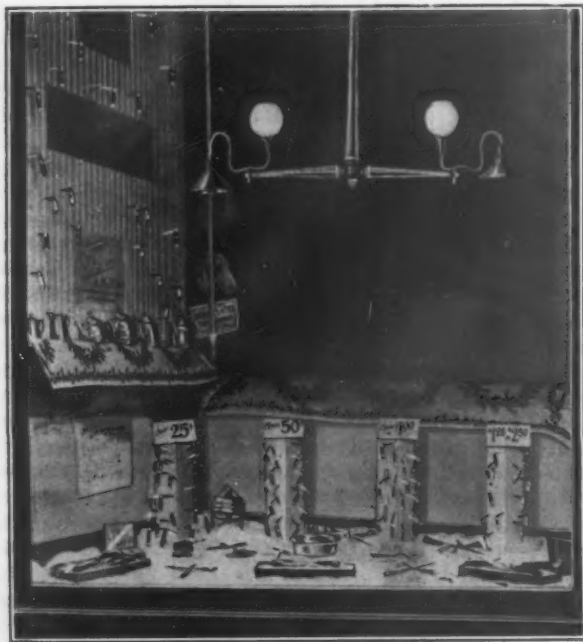
UNITED BRUSH MANUFACTORIES, 21-23 Park place, New York, and Nuremberg, Germany (the German name of which is Vereinigte Pinsel Fabriken), have taken over the line of Toilet Brushes for many years manufactured by J. Finley Smith & Son, New York, adding them to their own large lines of Shaving Brushes and artists' goods, druggists' Pencils and Brushes of all kinds for painters and decorators. A. L. Smith, head of the house of J. Finley Smith & Son, is now connected with the United Brush Manufactories and maintains headquarters at the old address, 117 Chambers street.

The Valley Hardware Company, Paul's Valley, Okla., was recently incorporated for \$7500.

Cutlery Window of Albee & Seltz.

An Artistic Window That Helped to Sell Many Goods.

ALBEE & SELTZ, Galeton, Pa., recently had an attractive Cutlery window, which is reproduced in the accompanying illustration. The window of the firm is 7½ ft. wide in front and about 7 ft. wide in the back. It is of angular shape, one side being 6 ft. deep and the other side only 4 ft. In making a foundation for the display the bottom of the window was covered with plain white cheesecloth, as were also the upright pyra-



Cutlery Window of Albee & Seltz.

mids, in which the Knives were stuck. The pyramids were made of wood and stood 24 in. high. The background is a mirror 30 in. high, which gives the window a larger appearance and reflects the articles shown. A number of Knives will be seen sticking in the side wall at the left. The window was brilliantly lighted from the top as well as by the lamps shown in the center. The firm writes that the display was very effective in drawing trade to the store and expresses the opinion that Hardware merchants may benefit materially by devoting increased attention to their windows.

THE CALIFORNIA LOCK & HARDWARE MFG. COMPANY, Los Angeles, with factory at Riverside, Cal., which was organized some months since, has erected two manufacturing buildings, 60 x 200 ft., and office building, 20 x 40 ft. The company will manufacture a line of Bungalow and Builders' Hardware, Aluminum, Brass, Bronze, Gray Iron and Malleable Iron Castings, Sheet Metal Stampings, Windmills and Special Machinery. Pig iron necessary will be imported from England and Japan direct to San Pedro Harbor, only a few miles from the factory. The new company has absorbed the Pacific Malleable Casting Company and Western Lock & Hardware Company of Los Angeles. Business will be solicited in the territory extending from Mexico to Canada and from the Rocky Mountains to the Pacific Coast. The company has a capital of \$200,000 and the following officers: J. Brent Harding, president; A. H. Bailey, vice-president; H. C. Rich, secretary, and A. L. Patterson, treasurer. It is expected to have the plant in running order by July 1.

HENRY DISSTON & SONS, Philadelphia, Pa., are contemplating the erection of a new plant in Toronto, Ont. They have purchased four acres of ground at a different location from the present factory, and plans are now

being considered for several buildings on the new site. The intention is to dispose of the present plant, which is too small, as soon as they have got far enough along with the new proposition.

Requests for Catalogues, Etc.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, etc., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate.

FROM THOS. P. HARDESLEY, who recently opened up in business in Ericson, Neb., handling Shelf and Heavy Hardware, Stoves, Tinware, Paints and Oils.

FROM P. J. BURKE & SONS, who have purchased the wholesale business of Briley Bros., Dell Rapids, S. D. The new concern is carrying Shelf and Heavy Hardware, Stoves, Tinware, Window Glass, Paints, Oils, Sporting Goods, and also have a plumbing and heating shop.

FROM PRICE HARDWARE COMPANY, Pulaski, Va., which has been incorporated, with an authorized capital of \$50,000. The officers are W. H. Trelinger, president; A. V. Hancock, vice-president, and W. C. Price, secretary and treasurer.

FROM HOTEL & BUTCHER SUPPLY COMPANY, incorporated with capital stock of \$50,000, in Atlanta, Ga., handling hotel and butchers' supplies.

MRS. CLARK FISHER of Fisher & Norris, Trenton, N. J., has lately returned from an automobile business tour during which she traveled 2500 miles, the geographical limits being Baltimore and Washington in the south, Cleveland in the west, Buffalo in the north and the Hudson River in the east. During the trip Mrs. Fisher visited many merchants handling the Eagle Anvils and secured numerous orders. Next month she will sail for Italy to spend several months at her villa on Lake Como, returning in the fall to resume the active management of the business.

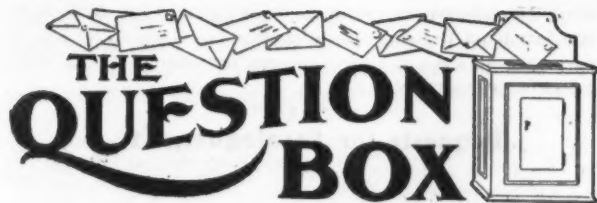
THE CONTINENTAL COMPANY, Detroit, Mich., handling the product of a number of leading manufacturers of Screens, has issued "The Continental Record," a four-page publication, the make-up of which is on the lines of a daily newspaper. A good deal of matter is thus presented in an effective way, pointing out the disease-spreading efficiency of the house fly and enforcing the importance of protecting the public health by the liberal use of Screens.

L. B. POWELL, formerly assistant manager of the Hayden-Corbett Chain Company, Columbus, Ohio, and since January 1 general sales agent of the Climax Chain Company, St. Louis, Mo., has become a director and treasurer of the latter company. Mr. Powell will continue in charge of the sales department and his election as treasurer is a substantial recognition of the results produced under his selling management.

THE MISSOURI RETAIL HARDWARE ASSOCIATION has issued its official gazette for the present year. It contains a report of the annual meeting of the association held in February, the constitution and by-laws, list of the Hardware merchants of the State and of the exhibitors at the annual convention.

THE BOWLER-HEALEY HARDWARE COMPANY, Chicago, has been incorporated with a capital stock of \$15,000 to handle Hardware, Cutlery, Sporting Goods, Fire Apparatus, &c. The officers of the company are Thomas J. Bowler, president, and Daniel J. Healey, secretary and treasurer.

CHAS. BROWN & SONS, Hardware merchants, San Francisco, Cal., are making plans for a new store covering an area 40 x 275 ft. It is proposed to arrange the building in the best possible manner with a view to appearance and convenience.



This department is open for the discussion of questions which arise in the practical conduct of the Hardware business. Our readers are invited to contribute, submitting inquiries or answering questions.

Correspondents are expected to give their names and addresses, but in order to encourage frank expressions of opinion the advice of our correspondents will be treated in confidence, names and addresses not being published.

For convenience, Questions or Answers should be addressed to THE IRON AGE QUESTION BOX, 14-16 PARK PLACE, NEW YORK.

Form of Lease and Note.

Form of lease and note to be used in the sale of stoves, machinery, &c., on installment plan.

A Pennsylvania Hardware house is looking for a form of lease for goods sold on installment plan with which there would be given a judgment note which could be discounted without invalidating the lease. Some of our correspondents have referred to the interest of this inquiry, but at the same time express doubt as to whether it will be feasible to accomplish what is desired. The matter is one which has received careful attention from some large and enterprising houses, and the conclusions they have reached will undoubtedly be of interest to many merchants who are looking for good methods in

the recourse there can be had. In other words, they cannot take the property and recover a judgment in addition.

I further inform you that we have a case on one of these notes in the Supreme Court of this State now, in which the maker of the note appeals his case against a judgment rendered by the Circuit Court on the note. He appeals it on the grounds that we were not entitled to a judgment except on the property held by the note. When this case is decided it will determine better the exact status of these notes, and will also decide as to whether these notes are really negotiable paper or not. Would say for the benefit of your inquirer, that the only risk in taking these notes is where they are made by irresponsible parties and for the full amount of the purchase. If a partial payment, and sufficient payment is made in cash at the time of the purchase to insure the seller against loss, if he has to take the property back when note matures, the note is perfectly good.

The Only Risk.

Checking Freight Bills.

The matter of freights is recognized by retail merchants generally as one of much complexity and difficulty. On this account there is no doubt that many merchants whose methods are otherwise up-to-date neglect their freight bills, and are consequently subject to over charges which they might otherwise escape. It is, however, encouraging to note that the matter is receiving more and more attention from the trade, and there is little doubt that one of these days retail merchants will be expected to give as careful and intelligent attention to their freight matters as they do to any other department of their business. Among the replies which have come in in answer to the question whether it is practicable for a retail hardware merchant to check his freight bills so as to catch

No.	\$.....		IND.....		19.....	
	.....after date, we jointly and severally promise to pay to the order of					
	THE.....		HARDWARE CO.,.....		AT.....	
			BANK,.....		INDIANA,.....	
					DOLLARS,	
	Without any relief from valuation and appraisalment laws; and the Drawers and Indorsers severally waive presentment for payment, protest and notice of protest for the non-payment of this note, and agree to pay attorney's fees and the costs and all other expenses incurred for collection thereof, with eight per cent. interest from date..... and eight per cent after maturity, payable quarterly on note or judgment till paid; value received.					
	It is hereby agreed by and between the parties hereto that the title and ownership of the.....					
	for which this note is given is not to pass from The..... Hardware Co. to the purchaser until the purchase price thereof is fully paid and if this note is not paid when due said..... Hardware Co. or its agents may take possession of said property without legal process wherever it may be found, and may sell the same at public or private sale at any time or place for cash or on time without appraisalment or notice—the same being hereby waived—and apply the net proceeds of said sale, after deducting reasonable expenses incurred, to the unpaid purchase price of said property, and I hereby agree to pay to said The..... Hardware Co. or order whatever amount of principal and interest remains unpaid on this note after the net proceeds of said sale have been applied as aforesaid. It is expressly agreed that any partial payments made on this note, unless and until the full sum of said note—principal and interest—be paid, shall be taken and considered as rental for the property therein described.					
	.....		..... miles North		.....
	.....		..... miles South		.....
	.....		..... miles East		.....
	.....		..... miles West		.....
	.....		of said postoffice		.....

Form of Note Used by Indiana Hardware House in the Sale of Stoves, Farm Machinery, &c., on the Installment Plan.

this field. We refer below in detail to the practice of a prominent house in Indiana and explain the methods which they pursue. The form of note they use is reproduced and their advices on the subject are as follows:

FROM AN INDIANA HARDWARE HOUSE: I inclose you a copy of the note we have used very extensively in our business for a number of years past. I think that the form is as complete as can be had, and I am advised that there is no question of its legality, as far as holding property in this State. I think there are defects in it that cannot be cured that at times might cause annoyance and loss to the holder of notes of this character. The decisions in this State seem to be to the effect that the holder of these notes can take property described in the note and for which the note was given, and that is all

Property Can Be Taken.

over charges and collect for damages, we have the following suggestive reply:

FROM A MERCHANT IN WESTERN PENNSYLVANIA: This is a question that we have had very little to do with, because east of the Mississippi River nearly all the goods are delivered by the manufacturer, who shows on his invoice just what freight we should pay, which gives us a check to go by. If we notice that the railroad charges us in excess we return the freight receipt to the manufacturer who shipped the goods, that he may take it up with the railroad, and in many cases we get the excess freight paid returned to us direct from the railroad company.

Loree & Reilly, Emmett, Idaho, have been succeeded by E. M. Reilly & Co.

Price-Lists, Circulars, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

SCHATT & MORGAN CUTLERY COMPANY, Titusville, Pa.: Catalogue No. 2, with 128 large pages, effectively illustrating a large and varied line of Pocket Cutlery and Razors, shown on tinted background. An exterior view of the factory is given, as well as six views of different manufacturing departments.

DUSTO MFG. COMPANY, 475 Broadway, New York: Illustrated circular describing the Dusto Vacuum Carpet Cleaner.

ABERCHOMBIE & FITCH COMPANY, 57 Reade street, New York, Sportsmen's Goods: Illustrated folder with sample of Fustian Cloth for outing clothes.

INTERNATIONAL CUTLERY COMPANY, Fremont, Ohio: Catalogue No. 909, relating to Shears, Scissors, Tinner's Snips and Pruning Shears. This is one of several small catalogues the company is about to issue, in preference to one large book.

ARKON CARBON COMPANY, First National Bank Building, Chicago, Ill.: Booklet relating to Arkon Carbon Paint, in which attention is called to its protective and preservative qualities when used as a coating for iron, steel and wood.

JAMESTOWN METAL FURNITURE COMPANY, Jamestown, N. Y.: Circulars illustrating steel Security Boxes and steel Vertical Files, two of the company's new productions.

GENERAL COMPRESSED AIR & VACUUM MACHINERY COMPANY, 4436-4438 Olive street, St. Louis, Mo.: Catalogue illustrating and describing the Thurman Portable Electric Vacuum Cleaner. The machine can be operated

from any electric light socket. A complete set of devices goes with each outfit, to clean carpets, rugs, upholstery, tuft buttons, draperies, tapestries, walls, bare and tile floors, clothing, mattresses, &c.; also face and body massage tools.

REID-EDELMUTH MFG. COMPANY, 247 Bush street, Brooklyn, N. Y.: Catalogue illustrating Ice Cream Freezers, Egg and Cream Beaters and Whips, Screwdrivers, Kitchen Knives, Cleavers, Carving Knives, Grass Hooks and Shears, Tack Pullers, Ice Chisels, Can Openers, &c.

G. M. THURNAUER & BROTHER, 83-85 Worth street, New York, importers of House Furnishing Goods and specialties: Illustrated folder of Alcohol Flat Irons, Cooking Stoves, small Stoves, Egg Boilers, Curling Iron Heaters, &c.; also circular relating to aluminum flatware, including Spoons, Knives, Forks, Ladles, &c.

GENERAL FIREPROOFING COMPANY, Youngstown, Ohio, New York office 10 East Thirty-third street: Illustrated folder of all-steel Clothing Lockers, including single and double tier of different types.

BUFFALO MFG. COMPANY, Buffalo, N. Y.: Catalogue and appendix illustrating Water Filters, Water Coolers, Chafing Dishes, Table Kettles and Stands, Coffee Extractors, Wine Coolers, Tea and Bar Urns, Bathroom Fixtures, &c.

JAMES L. TAYLOR MFG. COMPANY, Bloomfield, N. J.: Revised price-list No. 9, canceling all previous lists, relating to the Taylor Quick Adjusting Self-Locking High Grade Screw Clamps, made in different styles for various purposes.

O. P. SCHRIEVER COMPANY, 621 E. Pearl street, Cincinnati, Ohio: Descriptive catalogue relating to Galvanized Steel Chain Pumps, Curbs and Galvanized Steel Tubing, Casters, File and Tool Handles, Barrel, Keg and Box Trucks, Screen Wire Cloth, Measuring, Winding and Cutting Machine, and All Steel Wire Cloth Rack. The catalogue also contains Wire Cloth price book, with all prices, &c., figured out.

NATIONAL RETAIL HARDWARE ASSOCIATION.

Milwaukee Extends a Very Cordial Welcome to the Tenth Annual Convention—Entertainment of the Delegates a Marked Feature, Including Banquet, Luncheon and Automobile Rides—About 100 Delegates Present—Work of the Convention.

IN extending an invitation to the National Retail Hardware Association to hold its annual convention in that city, Milwaukee promised much, but in the fulfillment her promises were overreached. Every possible courtesy and attention were showered upon visiting guests and delegates, and nothing was left undone that might in any way make their stay more pleasant. In view of the lavish hospitality extended many appreciative comments were expressed by the delegates who had the good fortune to be chosen to represent their State bodies. The entertainments provided were generously planned and charmingly executed, always with due regard for the pleasure and enjoyment of the ladies, of whom about 60 wives and daughters accompanied the visiting delegates. Their presence imparted grace and brilliancy to the social functions in which they participated, and lent attractiveness to the open business sessions which many of them attended.

Reception and Luncheon at the Deutscher Club.

Handsomely engraved invitations were distributed for an informal reception and luncheon at the Deutscher Club, on Wednesday evening, and a banquet at the Hotel Pfister, on Thursday evening. Both of these entertainments were tendered by the following jobbers and manufacturers of Milwaukee: John Pritzlaff Hardware Company, Gender, Paeschke & Frey Company, Brand Stove Company, National Enameling & Stamping Company, A. J. Lindemann & Hoverson Company, Fuller-Warren Com-

pany, James E. Patton Company and Milwaukee Corrugating Company.

The weather, which during the meeting was otherwise perfect, was marred by leaden clouds and rain on Wednesday afternoon and evening, but in spite of this hindering influence but few were missing from the genial throng that assembled at the Deutscher Club at the appointed hour. The home of this club, which was formerly the residence of one of Milwaukee's foremost citizens, is surrounded by beautiful grounds and still retains an air of homelike comfort that makes it peculiarly inviting to the visiting guest.

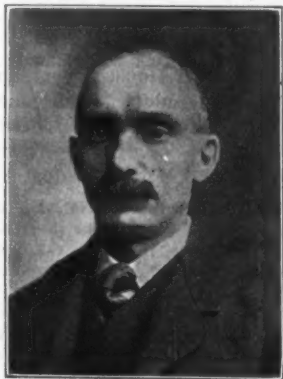
A large luncheon was served in the spacious auditorium, since added to the original building, and an excellent band rendered several numbers which were highly enjoyed by the two hundred and more guests seated at the tables. The programme also included several heartily encored songs by the merchants and manufacturers' octette. Addresses of welcome were delivered by William Reese of the James E. Patton Company, and Francis Cannon, secretary of the Citizens' Business League. These were responded to by prominent members and officers of the National Association. Between the music, speeches and cheer of good fellowship a most enjoyable evening was spent.

Banquet at the Pfister.

On Thursday night a banquet was given by the merchants and manufacturers at the Hotel Pfister. The ex-

quisite taste observed in the appointments of this feast was reflected in every detail. The tables, handsomely set with floral decorations, and excellent menu and toast list artistically engraved upon padlock shaped leaves, bearing upon the cover a fac-simile of the official padlock badge of the association in colors, were equalled only by the orderliness of the service.

Under the masterly guidance of Toastmaster Charles L. Cryderman, a number of toasts were responded to by



C. H. WILLIAMS.

able speakers. Speaking to the toast "Industrial Milwaukee," Judge W. J. Turner called attention to the fact that the industrial fame of Milwaukee was founded upon the products of her iron working factories rather than upon her more widely heralded liquid interests. Humphrey J. Desmond of Milwaukee, responding to the toast "A Little Optimism," delighted the audience with his views, anent the brighter side of things socially, commercially and industrially. Expressing his surprise at the large number of ladies present upon this occasion, he very gallantly remarked that, while it was in his mind to speak of the desirability of moral uplift in commercial

touch to the festivities in a short talk sparkling with humor and laugh provoking stories.

The Milwaukee Committee.

Too much cannot be said in praise of the untiring and efficient efforts of the committee charged with the duty of looking after the comfort and entertainment of the convention. This committee, representing the manufacturers and jobbers of Milwaukee, was comprised as follows: Edward Schwartzburg of the National Enameling & Stamping Company, Charles H. Cryderman of the John Pritzlaff Hardware Company, Louis Kuehn of the Milwaukee Corrugating Company, Charles Paeschke of Geuder, Paeschke & Frey Company and Frank S. Rost of William Frankfurth Hardware Company.

Automobile Rides.

An automobile ride about the city on Thursday afternoon was tendered the ladies by the retailers of Milwaukee and a similar excursion was taken on Friday under the direction of the Milwaukee State Association.

Convention Committees.

The following convention committees were appointed by the president:

RESOLUTIONS: S. R. Miles, Iowa; W. P. Bogardus, Ohio; E. M. Bush, Indiana; Nathan Roberts, Nebraska; F. A. Chandler, Massachusetts; D. E. Hibner, Pennsylvania; H. F. Krueger, Wisconsin.

SUGGESTIONS: L. C. Abbott, Iowa; Amos Marckel, Minnesota; E. S. Hayhurst, Nebraska; W. A. Vance, West Virginia; B. C. Bates, Ohio; J. W. Beasley, Alabama; Grant Porter, Illinois.

NOMINATIONS: C. F. Ladner, Minnesota; D. Kavanaugh, Nebraska; J. P. Duffey, Ohio; S. E. Jones, Indiana; L. G. Ernat, New York; Henry Weber, Michigan; O. A. Labudde, Wisconsin.

BY-LAWS: H. L. McNamara, Wisconsin; J. G. Ferres, New York; E. E. Mitchell, Arkansas; Nathan Roberts, Nebraska; F. Alex. Chandler, Massachusetts; L. C. Abbott, Iowa.

PRESS: W. P. Bogardus, Ohio; H. L. McNamara, Wisconsin; M. L. Corey, Indiana.

PLACE OF NEXT MEETING: D. F. Barber, New England; G. W. Hubbard, Michigan; E. N. Howell, Illinois; R. F. Roys, Arkansas; W. R. McIntosh, North Dakota; F. I. Pixley, South



M. L. COREY.



H. L. McNAMARA.



FRANK A. BARE.

life, it was quite evident that any movement which shared the co-operation of so many ladies was in no need of such advice.

Some interesting incidents connected with the early history of the National Association and its later developments were embodied in "Stray Shots," offered by the retiring president, A. T. Stebbins, while the "Serious Side of the Association Work" was touched upon by F. Alex. Chandler of Boston.

John H. Moss, president of the Merchants and Manufacturers' Association of Milwaukee, described "The Workshop of America," the theme of his toast, as embraced in the great industrial region lying east of the Mississippi and north of the Potomac Rivers. The tide of emigration pouring into this territory and its future industrial possibilities were vividly portrayed.

The toast list was concluded by H. G. Cormick, who by reason of his long connection with and personal interest in association work, was aptly chosen to respond to "Reminiscences," and in conclusion John M. Callahan, being called upon by the toastmaster, added a finishing

Dakota; Fred Pfaff, Oklahoma; A. P. Orrick, Mississippi; G. A. Pauly, Missouri; J. E. Grubbs, Kentucky.

Resolutions Adopted.

In order to avoid undue haste and lack of deliberation which sometimes characterizes the preparation of resolutions by a committee appointed at, and sitting only during the conventions, it was decided last year to take up this work during the interval of adjournment. In consequence of this action, the resolutions committee was able to present a well digested list of suggestions, which in their judgment were deemed worthy of careful thought and action. Besides an expression of thanks and appreciation for courtesies extended resolutions were adopted defining the association's attitude on waterways, bankruptcy laws, national highways, railroad restrictions, parcel post, the tariff and other questions.

New Officers.

The officers chosen to serve for the ensuing year are as follows:

PRESIDENT, Chas. H. Williams, Streator, Ill.

FIRST VICE-PRESIDENT, H. L. McNamara, Janesville, Wis.

SECOND VICE-PRESIDENT, Geo. W. Hubbard, Flint, Mich.
SECRETARY, M. L. Corey, Argos, Ind.

TREASURER, Frank A. Bare, Mansfield, Ohio.

EXECUTIVE COMMITTEE: Chas. H. Williams, Streator, Ill.; H. L. McNamara, Janesville, Wis.; Frank A. Bare, Mansfield, Ohio; Geo. W. Hubbard, Flint, Mich.; J. G. Ferres, Johnstown, N. Y.; L. C. Abbott, Marshalltown, Iowa; E. E. Mitchell, Morrillton, Ark.; Nathan Roberts, Omaha, Neb.; Sharon E. Jones, Richmond, Ind.

ADVISORY BOARD: S. R. Miles, Mason City, Iowa; E. M. Bush, Evansville, Ind.; A. T. Stebbins, Rochester, Minn.

Next Convention at Denver.

When the question of choice of location for the meeting of the next convention came up, a spirited contest developed among the various cities extending invitations. The cities of Chicago, Detroit, Mich.; Jacksonville, Fla., and Denver, Col., and others offered their hospitality, but after due consideration it was finally decided by a majority vote to meet in Denver, Col. The date of the meeting, which was left to the executive committee, will be announced later.

No Reduction in Membership Fee.

The proposed reduction of the national membership fee from 50 cents to 25 cents, in view of the large balance in the treasury, failed to receive the indorsement of the convention, it being the sense of that body that the revenue derived from this source could be wisely used in the furtherance of the work, and was in nowise burdensome to the members.

CONVENTION NOTES.

About 100 official delegates were present at the convention, which, with the ladies and other visitors, made an aggregate attendance which was probably larger than at any former meeting.

Among the guests representing other organizations were F. C. Lariviere, Montreal, and Weston Wrigley, Toronto, of the Ontario Retail Hardware Association, of which the latter is secretary.

The American Hardware Manufacturers' Association was represented by Robert Garland of Pittsburgh, its president, and the National Hardware Association by R. A. Kirk of St. Paul, both of whom addressed the convention. Mr. Garland's address is given elsewhere.

A large and appreciative audience listened on Wednesday to a "Review of General Conditions," by A. C. Bartlett. Broad and comprehensive in its scope, this address touched many phases of commercial activity and presented an especially keen and discriminating analysis of business ethics; no feature of the programme, indeed, aroused livelier interest or received more favorable comment than did this address.

"One-twelfth Gross of Ideas—Assorted Small" was the text of a paper presented by George H. Hubbard, Flint, Mich, which was uniformly regarded by those who heard it as of great practical value. In it were embodied many valuable suggestions born of mature judgment and thoughtful observation through a long and successful career in the retail hardware trade.

Representatives of the American Steel & Wire Company, Buffum Tool Company, Simonds Mfg. Company and the National Lead Company were present at the convention and held impromptu receptions, at which all were welcomed in their several quarters at the hotel. Many of the delegates were instructively entertained by an exhibit in the rooms of the National Lead Company, where the several stages in the process of making white lead were illustrated. The samples and cabinet comprising this display were a counterpart of the outfit which has been furnished by the company to a number of educational institutions for permanent use in their laboratories.

The works of the Brand Stove Company were visited by quite a number of the delegates, who as a memento of the occasion received a handsome souvenir in the form of a bronzed metal hat rack cast in the shape of a sword.

PRESIDENT STEBBINS' ADDRESS.

The presidential address of A. T. Stebbins was a very interesting and comprehensive document in which many matters of importance to the trade were discussed. During the year Mr. Stebbins attended a number of the State conventions concerning which he made the following observations and recommendations:

In visiting the different conventions, I made some observations and endeavored to note the portions of the programme that seemed to receive the most favorable consideration. The exhibits are especially attractive. The merchant sees many articles, like Stoves, Washing Machines, Implements of various kinds, likewise new goods and full lines of standard goods, all of which we cannot have the opportunity of seeing in our own stores. Again, the traveling man adds much to our enjoyment. He is the personal friend of the merchants in his territory. He is a genial good fellow, willing and anxious to show and explain his goods, and assist us in selecting and in buying. With such attractions at hand, it is hard at times to get the members to leave the exhibition hall for the convention. In some States, the management requires the exhibit hall to be closed during the hours of the meetings. Others give the members their choice, convention or exhibits. I am not so sure but the latter plan may prove the most satisfactory and give less cause for complaint. There is a good deal of Mother Eve in human nature, and when you tell a man he cannot do a certain thing he immediately thinks that is just what he wants to do. A majority, however, find ample time for both.

Exhibits are a strong feature of conventions, beneficial alike to exhibitor and dealer, and should be encouraged and put under the best of management. I suggest that good judgment be exercised in putting a reasonable price upon space. In States where exhibits are held and sufficient amount of money raised by the selling of space to defray the expenses of the convention, programme advertising should be dispensed with.

Mistakes are oftentimes made in arranging too long a programme, to the exclusion of the Question Box. This is to be regretted. The Question Box is the most interesting and important number on the programme. It gives an opportunity for every member to have any subject discussed that he is interested in, as well as an opportunity to take the floor, and when he does this he becomes more interested in the meetings. I attended only one convention where there were no questions in the box. Officers should see to it that the box is supplied.

The Committee on Resolutions oftentimes fall down in the performance of their duties. Ill considered and ill advised resolutions are sometimes presented and reported during the closing hours and adopted without due consideration. I would suggest that the Committee on Resolutions be appointed in advance of the meeting, to the end that they may have time to prepare their report. It is the resolutions rather than the speeches that reflect the sentiment and the policy of the association.

In some instances the Grievance Committee has little or no work to do. Members will tell of their grievances and violation of policy to their neighbors, but fail to report them either to the secretary or to the committee. I would suggest that the presidents of the various State associations emphasize this fact at their respective meetings. Practically all reputable manufacturers and jobbers are willing and anxious to co-operate in maintaining a reasonable policy. Others must expect publicity.

I wish to note a custom prevailing in some States, notably in Iowa, of sending delegates to visit adjoining State conventions. This custom is worthy of imitation. It both shows and creates an interest in association work and develops a fraternal feeling. Reports of these delegates are an interesting part of a State programme. This matter has been discussed in the trade journals and I would recommend it to the careful consideration of State officers.

Mr. Stebbins said that two of the most important factors in the uplifting of society were schools and civic organizations, and that the National Association should make for itself a name and exert an influence for better citizenship. In doing this it was not only necessary to discuss trade ethics and the means of promoting individual welfare, but also discuss matters of State and national importance. To the student of business, he said, the most interesting study of conditions to-day was the development of industrial organizations and the spirit of co-operation between those engaged in the same line of business. Referring to the tariff, bankruptcy laws,

parcel post legislation, catalogue house competition, mutual insurance and other matters, Mr. Stebbins continued in part as follows:

The Tariff.

The revision of the tariff has agitated the minds of the people more than any one thing of national importance during the year just passed. The situation is peculiar in that party lines are giving way to local interests. A very little study of this whole subject shows that the difficulty in agreeing upon the various schedules lies between the producer and the consumer and that the voice of the latter is being heard and will eventually be listened too, if not by this Congress then by one to be elected. Every interest seems to want protection for itself and free trade for the other fellow. The people are willing that the large interests shall be protected to a certain extent, in the interest of labor, but not to the extent of building up monopolies. Some may say that the tariff has no place in a report of this kind. But it must be admitted that the merchant occupies an important position in the consideration of this subject. He stands between the manufacturer on the one hand and the consumer on the other. He hears the complaints and observes the selfishness of both. We may not all agree as to detail, but we do agree that if Congress would act quickly and adjourn the country would breathe easier and all business become more active. A commission, with authority to study conditions and recommend to Congress from time to time changes in certain schedules to meet changed conditions, would, in my opinion, prevent an upheaval in industrial affairs which the enactment of an entire new tariff bill always creates. I recommend to the Resolutions Committee a careful consideration of this subject.

Merchant's Position.

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The Bankruptcy Laws

have an important bearing upon the business interests of the country. The Nelson bill has been tried, and been found wanting. The Sixtieth Congress adjourned without passing any amendment to the present law, or the Shirley bill, which bill was indorsed by the commercial bodies of the country. Retail organizations have been urged to use their influence with members of Congress in favor of this measure. This subject is worthy of our consideration.

Parcel Post.

While we have been given the credit of thus far defeating parcel post bills, the various measures that have been introduced in Congress during the present session reveal the fact that our work in this direction is not completed, and that we must be on the alert at all times. I trust that you have all read Senator Bailey's letter to one of his constituents, a copy of which has been placed in the hands of all our members; also an article published in *The Iron Age* May 13 regarding express rates. Both are interesting and instructive, and, if any of you have not read, do so.

I have this recommendation to make: That a strong committee be appointed to go to Washington before the present session of Congress adjourns, and present the matter fairly and squarely before the members. Delays are dangerous. Some of the members have not decided as to how they will vote, but may during the vacation. The friends of the measure have had delegations there galore, while we have not. I am creditably informed that such a committee would be welcome.

Catalogue House Competition.

The catalogue house question has been discussed at nearly all the State conventions. It is a question that is ever with us, and we cannot and should not escape the responsibility of meeting the issue.

Some good has been accomplished. Standard brands of goods have largely been eliminated from the catalogues. Slowly perhaps, but surely, our members are becoming imbued with a spirit of loyalty to our friends who refuse to sell them. The best argument we have is the quality of the goods these houses send out, which is causing them to lose customers.

In view of all the existing conditions it is up to us to use the weapons we have at hand. Talk quality, not prices. Educate our customers. Be loyal to our friends. By fair dealing and honest methods try and make our customers satisfied and our greatest troubles will be those that never happened.

Mutual Insurance.

It is with great pleasure that I am able to report an increasing interest in our mutual insurance companies. Doubts that have disturbed the minds of some of our members, especially in States that have no such companies within their borders, regarding the solidity and legal standing of these companies are being rapidly dissipated. Prompt payments in case of losses and fair dealing in settlements have created unbounded confidence. The records of State Insurance Commissioners show that old line companies have discriminated against Hardware stocks. Per-

haps it is because we have sat still and entered no protest. In Minnesota the losses in Hardware stocks have been but about two-thirds those other stocks and yet we have been rated practically all alike. If I have the correct figures, there has been fully \$300,000 returned to our members in the way of dividends by our mutuals. The insurance feature should be made more prominent at the State meetings. As a means of increasing our membership it has no equal. As an economic proposition it spells money.

Relations with Manufacturers and Jobbers.

If there is one thing to be desired more than another in the future work of our organization it is to form still more friendly relations between the manufacturer, jobber and ourselves. I think we have failed, in part at least, to impress upon either the manufacturer or jobber the importance of the retailer in the matter of the distribution of goods. They are wont to forget the fact that there are upward of 25,000 retail Hardware merchants laboring in season and out of season 365 days in the year, that they might live, prosper and enjoy the blessings of life. The manufacturer makes his wares and they must be sold. The cost of selling a single line forbids that he sends his salesmen all over the country to dispose of his manufactured products, hence he seeks the jobber as the one who can most economically collect the various fines that go to make up a complete assortment of goods and distribute them. So far, so good, but has the manufacturer in making his contracts with the jobber taken the retailer into account as he should? Has he sufficiently considered the importance of the retailer in the transaction, and his rights in the matter of prices, &c.? The jobber quite naturally makes the most of his opportunities with his friend, the manufacturer. They hold their conventions at the same time and place, exchange greetings, and legislate so as to better their conditions. It has not been our privilege to be represented at these meetings until recently, and therein appears a bright ray of sunshine and hope that the getting together and promoting more friendly relations may result to the good of all concerned.

Retailer's Part Not Emphasized.

It is up to us to act intelligently in this matter. The future and success of the National Retail Hardware Association is largely what the members make it. No man or set of men ever became masters of the situation by accident. All great leaders have been inspired with a great belief. In 9 cases out of 10 failure was born of unbelief. To be masters of the situation requires thought, belief and action. Thus with earnest thought combined with patience and energy I bespeak for this association a successful future, and eventually it will become master of the situation.

SECRETARY COREY'S REPORT.

The annual report of Secretary Corey referring as it did to the status of the association and its work since the last convention in St. Louis was listened to with close attention and appreciation. Mr. Corey announced a large increase in membership, a substantial balance in the treasury and a continued harmony of thought and action in the association. He said that whatever doubt or distrust existed in the minds of outside friends as to the future of retail Hardware associations in the light of present conditions and past experiences was no longer justified. Guided by fair, honorable, conservative leadership the progress had been steady. Experience and added knowledge of trade conditions; as well as personal acquaintance with manufacturers and jobbers enabled the organization to have a voice in shaping and directing the channels of retail Hardware distribution which was impossible so long as each dealer stood by himself. Mr. Corey then referred to the parcel post question and continued in part as follows:

Convention Dates.

There was less complaint of conflicting convention dates this spring than usual. The grouping arrangement of States was of great advantage and can be still further improved by some of the States holding conventions in January. We believe that every State south of Chicago will find that the last two weeks of January are good meeting dates, especially the States that have Hardware exhibits in connection. We have sounded several manufacturers as to this and all agree that in January they would receive more benefit from showing new goods and more first orders would be given by dealers. Our members have generally taken their inventory and are selecting their lines and making ready for spring business. This matter is mentionel for the consideration of our State secretaries.

New State Associations.

Florida was the only State organized during the year and this joined the National in October. The principal credit for stirring up interest and calling the dealers together should be given to W. K. Jackson of Lakeland, who is a delegate to this convention.

We have had some correspondence with Virginia Hardwaremen. We have promised to attend as well as render assistance in calling a meeting if sufficient interest is manifested. We believe, however, we will gain more by helping the already organized States than by adding new territory.

This completes the organization of the extreme southern field, with the exception of Louisiana, and as this State has only about 150 Hardwaremen it might be best for Mississippi to open the doors to those who are interested in this territory.

Kansas is the only northern territory that is not building up a strong Hardware association. A few of their dealers have joined Nebraska, but not many. This is the home of Secretary Hodge of the Implement Federation, who is also secretary of the Kansas Implement and Vehicle Dealers' Association and they have a strong organization, as nearly all the Hardware dealers handle Implements and many have found an association home by joining this body.

National Body 11,000 Strong.

Every State organization has made a substantial gain in membership since our last national convention. Pennsylvania and Missouri have made phenomenal records. We can now count about 11,000 firms as members, an increase of 1500 from our last report.

The wonderful success of our Hardware fire insurance companies and the limitation of its benefits strictly to members in good standing should be given a large share of the credit for this very satisfactory showing.

Co-operative Buying.

Hardware jobbers naturally resent any attempt at co-operative or syndicate buying by the retail trade. Our associations have always wisely refrained from indorsing any schemes of this character. We believe conditions such as exist in the Hay Tool trade directly influence retailers toward co-operative buying.

No stronger object lesson is needed than the fact that an order for 25 carriers will secure 25 per cent. lower price than an order for 10. It is simply the old, mixed up, long debated question of quantity or class buying. Catalogue houses, big department stores and large retail mer-

chants are constantly urging their claims as quantity buyers. Wholesalers want to regulate buying privileges by arranging and maintaining a jobbers' list. Some manufacturers are using one system, some another, while the majority perhaps use any combination that promises to secure the greatest amount of business. It is a big problem.

In its working out and adjusting retail interests should have more voice and influence. That they are not more considered to-day is simply because of their great number they are harder to unite and slower to move.

Information Bureau.

The advantage and benefit of combined retail organizations maintaining a Bureau of Education that will distribute a large amount of printed matter, calculated to influence public sentiment on such questions as good roads, parcel post, &c., cannot be denied. Three difficulties stand in the way—lack of extensive co-operation; lack of suitable literature, and lack of printing and postage funds.

Many requests for special information come to us from members, from manufacturers and jobbers. If often requires considerable investigation before we can give an intelligent answer. We recognize the importance and advantage of being in position to handle these inquiries promptly, and have secured reference books that will assist us in the future.

An Information Bureau for the use of the trade will prove beneficial, provided our people use the privilege freely.

Business Complications.

There are more difficult business complications facing the manufacturer, jobber and retailer to-day than ever before. The manufacturer finds his name, and the high reputation he has built endangered by the increasing demand for special brands and cut price tactics of catalogue houses. The regular jobber must compete with the mail order jobber as well as the ever increasing members of his own class. Some jobbers still use their buying advantages to fight the retailer for the large consuming trade. This has always brought more or less trouble, but one effect has been to cause the large retailers to buy more goods direct of manufacturers.

What is termed the country dealer is depended upon more and more to furnish the jobber his volume of trade. Increasing population constantly adds to the consuming ranks, but the channels of merchandise supply are also being multiplied. Competition at home and abroad must be reckoned with by the successful merchant of to-day.

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ADDRESS OF ROBERT GARLAND.

Robert Garland, Pittsburgh, as president of the American Hardware Manufacturers' Association, brought greetings and delivered an interesting and able address, as follows:

As you perhaps know our association meets in joint convention with the Jobbers' Association, and I can testify to the fact that these meetings produce not only feelings of good fellowship, but also bring about good results. It is well recognized that properly organized bodies can accomplish results where individuals, working separately, will fail. Thus we have the Manufacturers' Association, Jobbers' associations, the State Retail associations and the National Retail Association. If the attendance at these different meetings be any index of their success, then we must believe that they are surely successful.

And so far as the manufacturer, the jobber or distributor, and the retail house are concerned, we are certainly getting closer together, and, as time goes on, better understandings are reached among us, and while we might be said to travel different roads, our aims are identical. We are all doing our best to conduct business on better lines; we are all doing what we can to build foundations that will stand the test of time.

What Competition Compels.

Competition is hard to regulate. We will always have it confronting us in a more or less marked degree. We, however, get it in different forms, while you, in your own locality, are subjected only to local conditions. The manufacturer competes with his brother manufacturer in other locations, and, at times, with goods of foreign manufacture. Geographical situation; price of labor; cost, fuel, and other such items must be considered; the factory system must be closely watched; the most up to date machinery must be installed; all labor-saving devices and means must be employed; there must be the strictest supervision so that quality of output may be maintained, and a perfect cost system must be in operation. Comparatively speaking, you do not have so many of these different factors to contend with.

Tariff and Profit Percentages.

Then we have that great bugaboo, the tariff, constantly looming up before us, when some of us must get busy down at Washington. Now, on this matter of tariff, some points brought out lately in the Senate discussion on the bill must have struck the trade rather forcibly. It was alleged that certain articles sold by the manufacturers for 90 cents per dozen, or $7\frac{1}{2}$ cents apiece, were sold by the retailer to the consumer for 40 cents each, or a little over five times the manufacturers' price to the jobber. Other articles were mentioned as being sold by the manufacturer at 47 cents each, which were sold at retail to the consumer for \$3.

Now, I have no knowledge as to just what would be the average profit the retailer in general will get from the consumer, but I very much doubt that you gentlemen in the Hardware business are getting such large returns on your sales, and I am positively sure of one thing, that on general Hardware staples, as between the manufacturer's cost and his selling price, the margin is particularly small. The manufacturer, of course, sells in larger volume, and should, therefore, do business at a smaller percentage of profit, but when one stops to figure that in the manufacture of what might be called common or staple lines, the manufacturer often sells his goods at 2, $2\frac{1}{2}$, 3 and very seldom over 5 per cent. profit, and if those goods finally reach the consumer in small lots, or by the single article, and are sold, as alleged in the examples shown in the Senate a few weeks ago, then why should the people in general and perhaps even some of our good friends engaged in trade, look askance at the manufacturers of this country when tariff is mentioned, classing the manufacturers as robber-barons, or the like, overlooking the fact that the ultimate high price of the article, or the price which the public is charged, is something entirely beyond the power of the manufacturer to control, excepting in the very few instances where resale prices are in effect. It is a mistake to assume that protection to our industries always implies that the manufacturer is put in a position to take to himself additional profit. The leveling influence of competition does not allow extraordinary margins.

Differentiating Domestic and Foreign Prices.

It is well to remember, also, in this connection, that the private citizen, not in trade, without any thought, or without ability to analyze these matters, will, now and then, contrast the prices which he must pay for an article as against the price in some foreign country, and if there be a great disparity, our protection system is abused, which means that the manufacturer shoulders the blame while the fault lies equally as much or more in the distribution, or by reason of the multitude of trade channels through which the article must pass before reaching the consumer. At each step its value has increased to the public. This, of course, is general, and not particular with reference to the Hardware business. It simply goes to show how manufacturers as a class are often unduly and wrongly criticized when they at-

tempt to have their interests adequately protected from foreign cheap labor markets.

How the Consumer's Price Is Determined.

I would like to show you who came here from different States in the Union, and who are in constant touch with the American consumer that criticisms as to prices of commodities or staples should not alone be directed at the manufacturer. We are all in the same boat. We manufacture the goods, and we want a fair return for our efforts. The jobber employs his capital in stocking our goods and distributing them, and is entitled to a fair profit, and you, in turn, want your profit, but we all unite in fixing the price to the public.

Importance of Maintaining Quality Standards.

I might also say that in the recent investigations on the tariff question, it has been brought out that very often the manufacturer sells his product at cost in order to run his factory, and so that his organization may be kept up by giving his men employment; and even in such times the manufacturer does not cheapen his quality. It has gotten to be a well recognized fact that quality of output is being watched more closely as time goes on and progressive methods are constantly setting the standard higher. A successful manufacturer will not cheapen his product, but will use every means, and go to extra expense to better his goods.

Standard Requirements.

In some lines, particularly in almost all supplies handled by the electrical supply houses which go into the wiring installation of a house or other structure, a standard code of requirements is in effect, which must be complied with, and the use of a label issued by the National Board of Fire Underwriters, which means that actual inspection of the output at the factory has been made by the underwriters' representative, and which assures the owner of the building that the wiring system has been installed with approved materials, guarantees that the danger from fire hazard has been minimized, or, perhaps, almost entirely eliminated.

This label system showing that the articles used have been properly manufactured under a recognized code of requirements may in time spread to other lines, and it could properly be applied to all goods used in plumbing or for sanitary purposes. Our friends, the National Supply and Machinery Dealers' Association in their "Declaration of Principles" under which business should be conducted, have advocated standard requirements for certain lines of machinery; for leather belting; babbit metal and other such products. In the general line of Hardware, this is not, in my opinion, necessary.

It should be remembered that the raw or the semifinished material out of which Hardware is manufactured is generally made according to specifications, experience and practice showing just what is best suited to make a proper finished article.

Full Weight and Measure.

What we are giving you, and what you want to get is good quality goods and proper weight and measure. If you buy 100 ft. of a certain commodity sold by the foot, you should not have to measure to see if you only get 95 ft., or perhaps a few feet short of the billed quantity, and if you pay for material by count or weight, you want all that is coming to you.

Charter of Liberties.

When our forefathers at Runnymede, June 15, 1215, through the Barons, forced King John to sign the Great Charter, one of the many provisions of that Magna Charta was the inauguration of standard weights and measures. The charter was intended as it reads: "For the benefit of the community of interests of the English people." From that day to this all English-speaking countries have had standard weights and measures, and the Anglo-Saxon people of to-day are just as keen on getting full measure in every respect as were their forefathers when they forced the issue from the tyrannical King by strength of arms.

Cardinal Points.

"Quality will tell." And, let me tell you, you men who come in direct contact with the consuming public, that the American manufacturer to-day is proud of his factory; proud of his organization; jealous of his good name, and, therefore, particularly strong on this important point of quality.

Relation of Manufacturer to Retailer.

We manufacturers do not come much in contact with the consuming public; you do, and we recognize that in a number of cases you introduce new goods, new styles and designs, and generally pioneer the demand for certain articles. This we appreciate, and for such service you have our heartiest thanks. Now, please remember that we have the same common interests of the Hardware business at heart; that we are not extortionate in our prices, nor are we making extraordinary profits—the Lord knows we all have sufficient competition to keep our prices in line, and we are doing our best to keep up a proper standard of quality, so that American-made Hardware will continue to stand as it does to-day—head of its class.

A GENERAL REVIEW OF CONDITIONS.

A notable feature of the convention was an elaborate address by A. C. Bartlett, president of Hibbard, Spencer, Bartlett & Co., Chicago, from which we make the following extracts:

The Hardware business began in the dark and dirty corner of the general store, emerged by degrees into the daylight and lamplight of an approximate equality, and finally, abandoning its companions, started upon a career of its own, with a full fledged Hardware sign over the front door. The casual and superficial observer reaches the conclusion that the business is now engaged in a recessionary movement, but a careful study of the conditions will warrant a different conclusion, that it is forging ahead—is making progress in the right direction.

The Tail Has Begun to Wag the Dog.

It is true that in the large cities the department store has made inroads upon the business which formerly went to the exclusive Hardware establishment, but, on the other hand, the great bulk of the trade, represented as it is by the country retail merchants, has been extended and increased by added lines, which, under previous allotments, belonged to other branches of merchandising. In other words, what was formerly considered the tail of business has begun to wag the dog. It has been discovered that the Hardware store can be made more attractive in appearance, and therefore more readily and cheerfully visited by prospective buyers, if its stock and showroom are not exclusively devoted to Nails, Barbed Wire, Pitchforks, Strap Hinges, Screws, Carriage Bolts, and kindred articles. Naturally, the more profitable lines are those which can be displayed in the front window, in glass cases, and upon a well appointed division of floor space, and which require the better salesmanship to insure their prompt sale. Articles which were formerly sold by demonstrators and canvassers at high price and great expense, are now part of the regular Hardware stock and are sold in the ordinary course of trade. Paints and Glass have disappeared from the drug store and appeared in the Hardware store because they easily belong with building material and trimmings. Cutlery is steadily finding less favor in dry goods, notion and drug stores, and is becoming a larger element in the sales of the Hardware merchant, partly because the Hardware dealer handles the higher quality and keeps a better assortment, and partly because he has learned the advantage of making a handsome display of this attractive line. Guns, Ammunition and Sporting Goods are no longer divided between the exclusive handlers of these lines and the druggist, but are now generally sold by the Hardware dealers. Many decorative articles, and those designated as Yankee notions, add to the artistic effects and to the net profits of the Hardware stores.

What is true of the retail is equally true of the wholesale stock. One of the great advantages which the jobber possesses over the manufacturer is his ability to supply upon demand a large variety of articles, all of which can be promptly shipped under one invoice, thereby economizing in labor, in time and in transportation expenses. The greater variety which the jobber can consistently furnish, the greater is his advantage over the manufacturer, and the more valuable are his services to his customers. And so the modern Hardware jobber is carrying lines of goods which two decades ago would have been considered very much out of place in their present environment; and the retailer is doing his full share toward reconstructing the indices of those volumes which name the articles bought and sold by the various branches of trade.

Automobiles as a Hardware Line.

Last month the president of a railroad company told me of a recent visit of one of his officials to a small town in Dakota—a town built upon land which eight years ago belonged to an Indian reservation—where he saw in use 29 automobiles.

Hardware retailers, and assuredly Hardware jobbers, have not, as yet, undertaken to carry well assorted stocks of automobiles, but no man will venture to predict how distant or how near is the day when these machines will be listed in the jobbers' catalogues, with a liberal discount to retail dealers.

Special Brands.

The demand for better things has manifested itself not only in the direction of luxury, but in insistence upon higher qualities of Staples, of Tools and of what we call Shelf Goods. This demand has led the jobbers to select the highest grades produced by the manufacturers of various lines and assemble them under a single trademark or brand, thus enabling the retailer to offer a large assortment of goods,

each article of which carries the distinctive mark of high quality. This renders the retail stock self-

Advertising advertising, for to quote our O. V. B. motto,

Feature "Any article of high quality sold to a consumer

advertises, without cost, every other article which bears the same brand." This self-advertising feature, and the assurance of substantially uniform good quality, are not the only benefits which the retail merchant has derived from the exploitation by the jobber of special brands. It has given him an object lesson in the unwisdom and unprofitableness of supplying his wants as they occur from each and every salesman who happens along at the time those wants manifest themselves. A retail, like a wholesale, stock made up of lines, each of which carries a variety of brands, is not only unsightly, but unsatisfactory, and is less profitable than one selected with a view to having the articles in

Reduces each line differ only in size or construction.

Competition. The, at least, partial control of a brand in a

local market reduces the competition between retailers to a minimum. As an illustration, many of the merchants in this assemblage will remember when the Hardware stock was not complete unless it included Ames Shovels, an article so well known and so staple that wherever competition existed was necessarily sold at a very light margin of profit. No better Shovel than that bearing the Ames label is made to-day, but the ratio of its sales has become exceedingly small.

Prejudice of the retailer against some manufacturers' brands has resulted from the innovation and competition of the catalogue houses. Naturally, neither the jobber or retailer cares to assist in distributing the product of the manufacturer who openly or surreptitiously supplies catalogue houses with his goods, at the lowest prices charged the largest jobbers. A merchant at Madison, Wis., rightfully contends that he should be placed upon the same general

The Retailers' basis of prices as a retailer in the city of Chicago, if he is to successfully compete for the consumers' trade in his own neighborhood; trade, which by the rules

Fair Contention. of environment and of tributary advantage belongs to him.

The two arguments in justification which the offending manufacturer offers, are, first, that the catalogue houses buy very large quantities, and, therefore, the temptation to sell them at low prices is too strong to be resisted, and, second, that these houses buy and introduce articles which the country retailers cannot be induced to put in stock and display.

If the only distinction made between different classes of trade is to be based upon the ability to purchase quantities, the retail business of this country will soon be centered in a

Quantity very few catalogue houses, located in a very

Purchases. few cities, and there will be no room or use

for the country merchant. That such a condition shall or shall not prevail in the future,

is, as I believe, within the province of the retailers of this country to determine.

While, as I have said, there is a well defined prejudice against handling the brands of goods which are passing through each railroad freight station and each express office on their route from the catalogue houses directly to the consumer, there is a lack of zeal and of fixed determination on the part of the dealers to absolutely exclude, so far as possible, those brands from their own stocks. Without intending to advertise any particular manufacturer, may I ask

simply by way of illustration, how many

Questions merchants in this assemblage, when purchasing

for Retailers. from the traveling salesman or in the

sample room, ask to have articles of Hardware

made by Landers, Frary & Clark (who a year ago announced through your official journal that their goods would

no longer be sold by the catalogue houses) to be used in filling

their orders, rather than those made by competing manufacturers

who supply catalogue houses? How many merchants

ask if the special brand of Saw they are buying is made by

Disston, or by some maker who is supplying the wants of the

illegitimate competition, and then decline to purchase those made by the latter? And yet, do you realize

that if all the members of the associations you represent should earnestly and with one accord discriminate in favor

of their friends and against their real enemies among the manufacturers of the general Hardware they handle, in 12

months not a catalogue house in the country could advertise

an attractive assortment of Hardware? Do you realize that

as soon as manufacturers of specialties in your line learned

that you are really in earnest in this matter,

Awakening such specialties would be withheld from those

Sentiment. houses, and the catalogue business, so far as

our branch is concerned, would be absolutely

dead? Do you realize that if each of your members would

awaken in this community among dealers of other lines of

merchandise—dry goods, grocery and general merchants—

this sentiment, this determination to use the influence and

power which they possess in the interest of their own and

their neighbor's business, the trade of catalogue houses in all

lines would soon be on the wane?

You say this means work. Certainly it means work, per-

sistent, hard work, but is there anything in this world worth

the having which does not require effort to secure? Is there any greater pleasure in life than that which results from achievement, especially when the obstacles to be overcome are great? The loyal manufacturers and jobbers cannot successfully fight this battle without substantial aid from you who are nearest the consumer. So long as you show indifference regarding the brands you sell, as to whether they are competitive or noncompetitive; so far as competing stocks of catalogue houses are concerned; still further, so long as you demand from your jobber the brands of goods which are in evidence in catalogue houses in preference to those of equal or better quality which such houses cannot purchase, so long will you continue to build up the kind of competition which you so emphatically denounce.

The plan which at one time was adopted by both jobbers and retailers (and which is still to some extent in vogue) of insisting that manufacturers who sell to catalogue houses should compel their customers to advertise prices affording a profit to the general retail trade, has proved to be a boomerang. One buyer has repeatedly told me that, without question, he alone has erected two stories upon a new building of a catalogue house by strongly advocating this plan and thereby adding to the profits of that institution. So long as 10 per cent. of the manufacturers (and unless the more drastic means are adopted there will always be a greater than 10 per cent.) cater to this class of trade, with no selling price restrictions, there will be a sufficient number of items to advertise at or below cost to render the whole assortment attractive. Americans love to be fooled, and none are more susceptible than the buyers of merchandise. Orders sent to catalogue houses for goods advertised at cut prices will carry with them memoranda of all the items wanted by the household and by co-operating neighbors, upon the presumption that if some prices are low, the others are necessarily low.

As I said, the second excuse offered by manufacturers for selling to catalogue houses is that they buy and introduce articles which the country retailers cannot be induced to put in stock and display. I believe this excuse is a valid one, and that the indictment could well include city jobbers as well as country retailers. Every merchant is adverse to putting time and labor upon an article which is not known to consumers, although, as a rule, the largest profits are realized upon the sale of new articles which have not reached the competitive stage. I remember hearing years ago the representative of the manufacturers of Bailey Planes say that when his people got out a new Plane, they found its introduction next to impossible until the catalogue houses, through their wide advertising facilities, had made it popular among consumers.

If all merchants, wholesale and retail alike, would do more real missionary work by way of enlarging their assortments with the latest product of the manufacturers, displaying them in their warehouses, and talking them to their customers, they would not only, to an extent, relieve the dispensers of catalogues of some of their self-imposed duties, but would increase their own profits. Let me say at this point that I do not believe there has been so nearly a universal neglect of opportunity by retail merchants in any other direction than in that of advertising. I do not mean bill posting, or necessarily newspaper advertising, but rather getting next to customers with something equivalent to personal interest or contact.

There are thousands of farmers and mechanics all over the country, each of whom is confident that the head of the catalogue house feels a deep personal interest in his welfare because he has received from him letters filled with warm expressions of friendship and assurances of loyalty to the interest of the particular class of citizens to which the farmer and mechanic belong; and with those letters have come large picture books which must have cost great sums of money to compile and publish. These books are accepted as souvenirs of good will. In contrast to this method of securing business what are the regular retail merchants doing? Are they studying the prospective wants of their customers, calling upon them, writing letters or sending circulars to show their appreciation of past trade and solicitude for present and future orders? Are they doing as much to "get next" to people with whom they are acquainted, as are distantly located strangers to "get next" to the same people? Our house (and I presume other jobbing houses have done the same) undertook to assist a little in this direction by issuing small, illustrated price-lists containing low but still profitable prices which our customers could send out, with their names, and theirs only, upon the title page and elsewhere, accompanying these lists with personal letters of their own writing. The main object was to attract visitors to the retail stores. Now, our people are in something of a dilemma. There are quite a large number of our customers who tell us that they consistently and conscientiously tried the plan and that the results were surprisingly good. They beg us

to continue the issue of these small books and to send new ones periodically. The larger number of our customers have derived little or no benefit from the plan. Investigations lead us to believe that the want of success upon the part of any merchant was due to his putting the books upon his counter and trusting that by some miraculous or automatic process they would do their own work; or to his dropping them into the waste basket because he did not wish to make the exertion which would be involved in their proper distribution. There may be a hundred better methods for reaching the consumer, but the retail merchant should certainly adopt and employ one or more of the hundred in attracting the attention and thereby securing the patronage of consumers.

After referring at length to the efforts made to establish a parcel post, the gradual tendency toward cash transactions, and the recognition of a higher code of ethics in business, Mr. Bartlett said in closing his exceptionally able and suggestive address:

Times have certainly changed. There is no manufacturer in this country to-day, who, to satisfy the cupidity of a supposedly respectable contractor, could be induced to make Files and Horse Rasps from bar iron to be furnished to the United States Army, as was done during the War of the Rebellion. No longer is it necessary to watch reputable jobbers in order to guard against the shipment of cheese for Grindstones because they happen to be the same shape, or against the shrinkage in weight of kegs of Nails which have passed through those jobbers' warehouses. The retailer of the present does not think misrepresentation of qualities is essential to his prosperity, or that trade must be secured from his competitor by trickery or by the undermining of reputation. Merchandising and morality, commerce and conscience, trade and truth, are in theory bound together by the closest ties of relationship, and in practice those ties are becoming more generally recognized and observed.

The associations which you have formed and are maintaining not only promise, but assure a constant and more perfect exhibition of those principles of frankness, fairness, unselfishness and integrity which are marking the progress of the business world.

Parker, Stearns & Co.'s New Plant.

PARKER, STEARNS & CO., manufacturing large lines of Rubber Goods and Specialties from clothing to rubber bands and liquid pistols, have moved from South street, New York, to a large modern building of brick, mill construction, between Sheffield and Georgia avenues, Brooklyn, N. Y., near the terminal of the Long Island Railroad at East New York. The site is 200 x 145 ft., the building covering 110 x 200 ft., five stories, with roof bleachery, separate cement making annex and capacious yard room. Power is supplied for main floor by a 500-hp. steam engine, and there are two independent electric engines of 300 hp. operating the rest of the plant. A driven well on the premises furnish water for various purposes, including the operation of large hydraulic presses, it being stored in a 75,000-gal. tank below with separate roof tanks for the sprinkler system, &c. A commodious office is located on the first floor, and there are excellent facilities for receiving, packing and shipping.

THE KEASEY PULLEY COMPANY, Toledo, Ohio, manufacturer of Power Transmitting Appliances, has appointed C. K. Turner & Son, 116 Broad street, New York, its representatives to handle export trade in Australasia, South and Central America, South Africa, Mexico, Far East, India, Hawaiian and Philippine Islands and the West Indies. Applications for catalogues, discount sheets, prices, terms, &c., should be directed to C. K. Turner & Son, who are authorized to quote lowest prices. The Keasey Company has made a specialty of export trade and is anxious to extend its business. Particular attention is given to the prompt execution of orders, careful packing and proper marking. The company makes Keasey Wood Split Pulleys with malleable iron hubs, Reliance Wood Split Pulleys, all Wood, Drop and Post Hangers, Pillow Blocks, Friction Clutches, Shafting, Couplings, Collars, Iron Pulleys, &c.

THE FRANKEL DISPLAY FIXTURE COMPANY, Quincy Show Case Works, San Francisco, Cal., has removed to 134-140 Sansome street.

MAKING GOOD IN BUSINESS

HINTS AND SUGGESTIONS FROM MANY SOURCES

The Secret of Having Roses.

Hinda: I wish
The sky would rain down roses, as they rain
From off the shaken bush. Why will it not?
Then all the valley would be pink and white
And soft to tread on.

Fedaïma: No, my prattler, no!
It never will rain roses; when we want
To have more roses, we must plant more.

George Eliot.

Seeing Opportunities.

It's strange, says a writer in the *Business Man's Magazine*, how some folks can see opportunities and even make them brand new, while the ordinary mortal couldn't see a thing doing. No doubt you have seen some man jump right along on the prosperity road from one station to another and you've wondered at it. You worked just as hard, more hours maybe, did your work just as well, and it did look strange that he could pass right on from the wheelbarrow to the carriage with a good prospect of holding a seat in the automobile, so to speak, while a lot of others just as competent apparently kept on at the wheelbarrow.

Looked Like Luck.

didn't it? Looked that way to me lots of times. But it isn't, not to any great extent, at least. I've come more and more to believe it was owing to a faculty the "lucky" man had. A part of that faculty is a good eye to see opportunity where other folks don't see it.

Inspiring Confidence.

Another big part is the ability to make other folks believe in you. Say what you will, "Nothing succeeds like success" is as true as the ring of a \$10 gold piece. And it is a little bit truer (if such a thing can be) in business than anywhere else. Take yourself. If you have some money to invest in something, do you hunt up a fellow to manage that investment, who wears an air of failure or only half believes in himself, or do you go to the confident man who believes in himself and makes you believe in him?

The ones I have noticed get out and go ahead have been men who were able to make other people believe in them. It goes without saying that they must have the training, application and ingenuity to make good on their plans. But before they can do that they must weld the confidence and faith of others to them.

Knowledge Useless Unless Applied.

Knowing how to do a thing is one thing; getting the chance to do it is quite another. Neither one is much good without the other. Having knowledge and having ability to apply that knowledge are entirely separate and distinct abilities. That accounts for the class of people we call "educated fools"—people with knowledge who can't use it—or get it into active play for their benefit. This doctrine has been hammered into me by the careers of several persons I know, and the true inside history of a lot of others.

An Example of Success.

Some one tells of a man who, after a discouraging beginning and an uphill fight, started in business in a small way in a Western city. He had little capital, but had an attractive personality and good ability. He was confident, courteous, magnetic and a hard worker. Gradually he increased his business. He got orders from local

houses for, say, sugar enough to make up a large order. He had his goods shipped in quantity, at low prices, direct from the first handler, being content with a small margin of profit. He became a member of the city chamber of commerce or business men's club. He didn't "shoot hot air" nor act foolishly, but took his place like other members, worked hard to help any club project, gained influence, and got the club to help him induce the railroad company to build a warehouse. He will be at the real head in the management of the warehouse, with rooms for display of his jobbing business. Talk about making opportunities and making folks believe in you. Here you find it.

A Motive for Action.

The endeavor to attain proficiency in any wholesome line of work, to surpass the standards of merit that have been attained by others, and to improve continually on our own past achievements, is the spirit of the honorable life. It is not for ourselves alone that we strive to attain a high standard, but because we should do our share toward the general progress of the world. To use it thus gives new energy to our endeavors and makes success more sure. A man's interest cannot be entirely separated from that of his fellows. The highest success cannot be attained without something of altruism in our motives, for that lifts our thoughts to a higher capacity than selfishness can possibly do. In order to do your best for yourselves you are forced to be an altruist.—W. P. Warren.

Puritan Cordage Mills.

THE Puritan Cordage Mills, Louisville, Ky., are erecting a plant, the main building of which, brick, is two stories high, covering 30,000 sq. ft. of floor space. In addition to this a storeroom is under way having a capacity for 300 bales of cotton. The mill proper will be equipped with modern machinery, costing approximately \$60,000. The company states that in addition to excellent railroad shipping facilities it will have the added advantage of river rates, and will at the start of operations employ about 150 hands. The principal item of production will be Sash Cord. One hundred and fifty braiding machines are already on the ground for installation and 75 more are to be delivered during July and August. There will also be installed 2000 spindles in the spinning room and 20 cards of latest design in the cardroom. C. L. Sweet, formerly manager of the Anniston Cordage Company, and later with the Samson Cordage Works, will be the mill manager and superintendent. The company's endeavor will be to put out the highest grade product at a moderate cost. The capacity of the new mill will range from 4000 to 5000 lb. finished product per day, and the mill is so arranged that the entire product can be turned from Sash Cord to Cotton Rope or Cotton Wrapping Twine at a moment's notice, if desired. In addition to Sash Cord, the principal product, the company will turn out an all-thread Cotton Rope and a fair amount of Wrapping Twines and Clothes Lines. It is expected to have goods ready for the market early in July, and the company is booking orders now for delivery at that time.

ANOTHER ILLUSTRATION of what manufacturers are doing with a view to aiding the retailers in the sale of their goods is afforded by the Frank Mossberg Company, Attleboro, Mass., which has got up an attractive metal display stand for its line of Wrenches which is being placed with Hardware merchants through a special offer. The stand is designed to hold the company's full line of Wrenches and so to display them that a salesman's time is only occupied in making the sale and not in showing the goods.

THE HARDWARE & MILL SUPPLY COMPANY, Pittsfield, Mass., has changed its corporate name to the Barris-Kenyon Company. F. W. Barris is president and G. A. Kenyon is treasurer.

Pocket Screwdriver Set, No. 231.

The Goodell-Pratt Company, Greenfield, Mass., is offering the screw driver set here illustrated, which is designed for carrying in the pocket and is accordingly made very light and small. The set consists of a hollow brass

allows shifting the knife to any position while grinding. The entire weight of the knife is carried by the holder, and the operator has full view of the work and easily controls the pressure and governs the grinding of nicks, gaps and any width or length of bevel without stopping for readjustment of any kind. The knife holder answers



Pocket Screwdriver Set No. 231.

handle, polished and nickel plated, which when closed is only $3\frac{1}{4}$ in. long and weighs about 4 oz. In the handle are contained three screw driver blades of various sizes and one square reamer, any of which can be quickly and firmly secured in the chuck, forming a very handy outfit.

The Karbo Grinder.

The accompanying illustrations represent the Karbo grinder, offered by the Whitaker Mfg. Company, 30-32

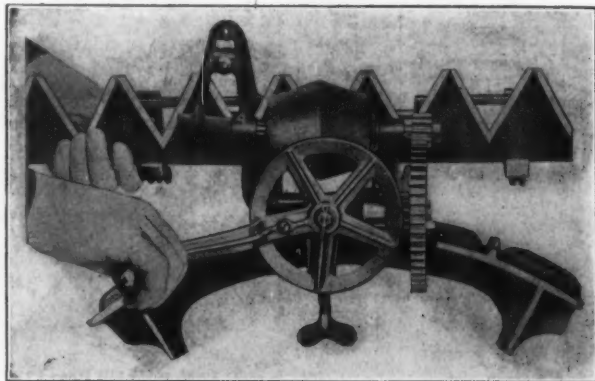


Fig. 1.—The Karbo Grinder Adapted for Mower Knives.

West Monroe street, Chicago, Ill. The grinder is alluded to as two machines in one, Fig. 1 showing it used for mower knives and general tool grinding, and Fig. 2 rep-

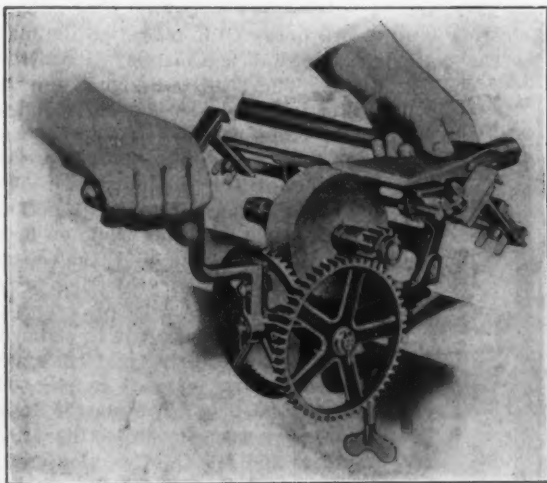


Fig. 2.—The Karbo Grinder Adapted for General Work.

resenting the machine with a straight face wheel for general grinding. The carborundum grinding wheels can be changed by the removal of one cotter pin. The machine is referred to by the company as simple in construction, easily operated and as being handily and securely fastened to a bench, table, or, while in the field, to a mower wheel. The mower knife holder, it is pointed out, is a new type, capable of any adjustment desired, and firmly holds the knife, with two guides or rests adjustable for any width or thickness of knife backs, and requires no change after the first adjustment. The spring clamp

for a tool rest, and is made rigid with lug and bolt, as shown in Fig. 2, and thus meets all requirements for general grinding such as axes, chisels, &c.

The Safety Whiffletree and Neckyoke Spring.

The accompanying illustration shows a safety spring for whiffletrees and neck yokes made from stampings by J. H. Sessions & Son, Bristol, Conn. The device is referred to as safe because its strength is such that it cannot well become unhitched by an accidental blow.



The Safety Whiffletree and Neckyoke Spring.

The helical spring used in its construction is said to be the most durable and satisfactory method of obtaining the tension required. The manufacturers also state that owing to the construction it is dependable and practically unbreakable; that it is readily worked, as it is only necessary to depress the top plate, which can be done with cold or gloved hands; and that it is not easily obstructed by ice, snow, sleet, sand or mud.

The Handy Harvest Keg.

The Union Cooperage Company, St. Louis, Mo., is offering the harvest keg shown herewith. The staves and heading are quarter sawed white oak, thoroughly kiln dried. The kegs are made by the dry process to prevent shrinkage or the hoops dropping off when kept in a dry place. The keg has a large mouthpiece, which is referred to as convenient in filling and emptying, and, being of wood, as not imparting color to the contents of the keg. The kegs are made in 1, 2 and 3 gal. sizes, 1 and 2 gal. sizes being put up one-half dozen in a bundle and the 3-gal. kegs one-third dozen to the bundle.



The Handy Harvest Keg.

The New Stantool Short Taper Shank Drills.

The Standard Tool Company, Cleveland, Ohio, is putting on the market short taper shank drills with a tang of much greater strength than its old Standard shank. The new and old shanks are illustrated in Figs. 1 and 2, showing the relative difference between them. The com-

pany remarks that taper shank twist drills with broken or badly distorted tangs have been a source of trouble and expense; the cost of turning a new shank on them being considerable, and when this was not possible they have been consigned to the scrap heap. To overcome this difficulty the stronger tang has been introduced. Special sockets and sleeves are required to adapt the improved shank to drill presses in general use, which are furnished by the company. These are made with outside taper to fit the spindles of the presses; the inner taper or hole being suitable for the Stantool shanks and also made with both outside and inside taper, conforming to the new standard, and these latter interchange or nest into each other. The company is also manufacturing a gauge that placed over the regular taper shank shows size and



Fig. 1.—The New Stantool Shank Drill.

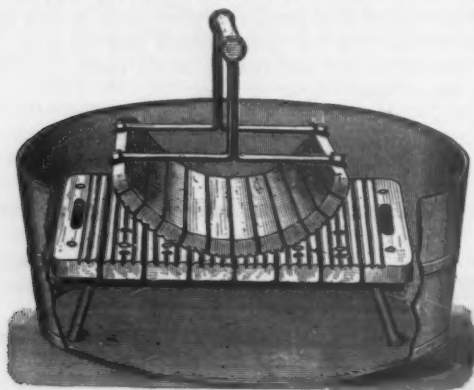


Fig. 2.—Old Standard Shank Drill.

location of the tang for the Stantool shank. This permits drills in use to be converted into the new type at little cost and trouble, and also enables old drills in which the original tang has been broken to be utilized.

Itsoeasy Clothes Washer.

The Itsoeasy Clothes Washer Company, 81 Warren street, New York, Neal & Scott Company, at the same address, selling agent, has put on the market the Itsoeasy clothes washer. It consists of but two parts and is designed particularly for use in stationary washtubs, but is equally serviceable in portable tubs. It is apparent that when operated in stationary tubs there is the added convenience of hot and cold water and the discharge of waste without carrying the water, and as the two parts may be left in the tub after use no extra room is required. In use articles are first well soaked to loosen the dirt, lessen the work and save the fabric. With the water on



The Itsoeasy Clothes Washer Adapted to Portable Tub.

a level with the base, pieces are spread on it in quantities equal to about 12 towels, soaping each piece separately, when, with the addition of an inch or two of boiling water, the segmental rubber is oscillated back and forth 20 or 30 times. This action forces the water and soap or other alkaline ingredients through the interstices of the goods. It is said to be especially serviceable in large pieces such as blankets, curtains, rugs, &c. The washer is made in four sizes, all 12 in. wide and ranging in length from 18 to 26 in., inclusive, to fit any size of stationary tubs. The birch woodslats are 1 in. thick, all metal parts are thoroughly galvanized and the 5-in. folding iron feet with rubber tips to prevent slip or injury to tub, make the base more compact for shipment or storing. Every machine is guaranteed by the company to give satisfaction or the purchase price refunded after a 30-day trial.

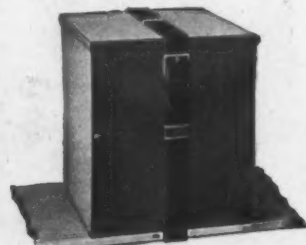
The New Dover Tourist Oil and Gasoline Kit.

The Dover Stamping and Mfg. Company, 385 Putnam avenue, Cambridge, Mass., has added to its line of automobile specialties the tourist oil and gasoline kit, the illustrations giving a view of the kit open and as it appears attached to the running board of an automobile. The kit is a neat, compact and dustproof device for carrying extra oil and gasoline when touring, and accommodates a sufficient amount of one's own brand of oil for an extended tour. It consists of a fine black enamel steel case, similar in appearance to a steel tool box, which may be instantly strapped to the running board. In size the device is 9 x 9 in., 10 3/4 in. high, with a capacity of 3 1/4 gal., and is furnished with strap complete. It con-

tains two special enameled cans, each 9 x 4 1/4 x 9 3/4 in., having a capacity of over 1 1/2 gal. each, with special pouring spout and filler cap. One can may be used for oil and the other for a reserve supply of gasoline, or both



Open.



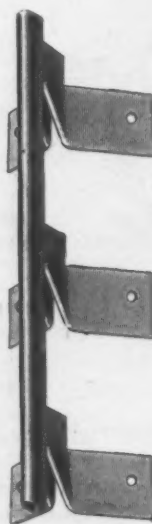
Attached to Running Board.

The New Dover Tourist Oil and Gasoline Kit.

for oil, or one of the cans only may be used and the space which the other can would occupy may be devoted to storage room.

The Clim-X Corner Bead.

The corner bead shown herewith is placed on the market by the National Metal-Fabric Company, Plainville, Conn.



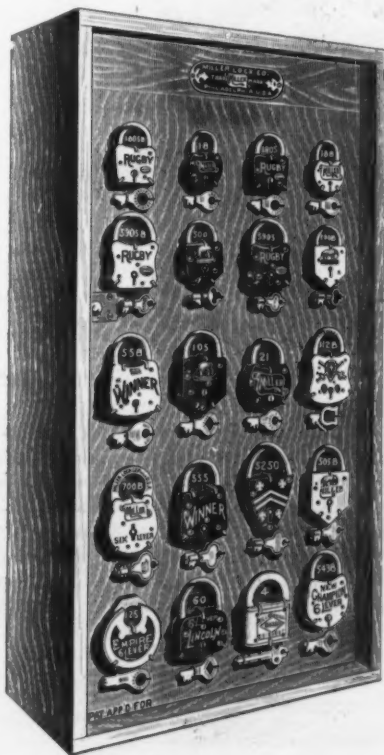
The Clim-X Corner Bead.

The bead is designed for the protection of plastered corners and is made from narrow strips of sheet steel run through machinery especially designed for the purpose. The metal is formed into a U-section, a right angle cut being made on both sides of the walls and the metal folded out to form projecting arms or wings at intervals of every 2 in. This arrangement, it is claimed, makes a particularly rigid construction, and when fastened in place is straight and true. The plaster flows readily between the projecting arms or wings and fills the U-section, making an absolute key for the mortar and a background for the bead, which permits it to resist any ordinary blow without loosening or cracking the plaster. Stock lengths of 6 to 10 ft., inclusive, are produced of galvanized steel strips, rendering the bead impervious to rust. The company states that the bead can be produced in

brass, bronze or zinc if so desired. It is attractive in appearance as well as protective; it is very durable, and under the improved methods of manufacture the company claims that it cannot be excelled as regards rigidity, strength, durability and finish.

Retailers' Padlock Display Board and Stock Case.

The Miller Lock Company, Frankford, Philadelphia, Pa., is putting on the market the display board and stock case for padlocks herewith shown, which samples and stocks 20 different patterns, a total of 12 dozen. The sample board is of polished hardwood, 12 x 24 in. in size, displaying the 20 padlocks in five rows of four locks each, the padlocks being so grouped that each row sells at a different price, ranging from 10 to 50 cents. The locks sampled on the board are carried in cartons



Retailers' Padlock Display Board and Stock Case.

inside the case, in which shelves are provided to divide the stock, and the quantity of each lock varies according to its selling capacity, the higher priced locks being stocked in the smallest quantities. The advantages of this arrangement include economy of time in making sales, eliminating the liability of making errors in prices, key mixing, &c. The cabinet can be placed in a show window, or, if desired, the board can be taken from the box and fastened to one of the shelves, thus allowing the stock to be kept on the regular shelving back of the sample board.

The Holwick Motor Driven Meat Chopper.

B. C. Holwick, Canton, Ohio, is manufacturing an electric driven meat and food chopping machine which is known as the Holwick Rapid meat chopper. The machine is portable and the chopper can be instantly detached by loosening a thumb screw. It is claimed that this machine will not heat or discolor the meat or other food. The cutting process is the same as with a pair of shears, and strings, sinews or gristle cannot pass through without being chopped. The average cost of operation is said to be but 3 cents per 100 lb. The machine is fitted with ½-hp. Westinghouse alternating current motors or Robbins & Meyers direct current motors, and its operation is referred to as practically noiseless. The machine is handsomely finished in cherry red, striped in black and gold. A standard pulley attachment is provided to drive slicing machines, mixers, kraut cutters, &c., and also a grindstone attachment with adjustable shield, drip basin, &c. The machine is 15 in. high, occupies counter space 10 x 12 in. and weighs 120 lb.

The Diamond Edge Safety Lock Press Button Knife.

The accompanying illustrations relate to a safety lock press button knife, put on the market by the Norvell-Shapleigh Hardware Company, St. Louis, Mo. The fea-



Fig. 1.—The Diamond Edge Safety Lock Press Button Knife.

ture of the knife is the safety lock, the locking mechanism operating on the same principle as the safety on a hammerless shotgun. When the safety lock is pushed into position it is impossible to open or close the blades, according to the position they are in, until the safety lock is released. To open the knife the lock is released

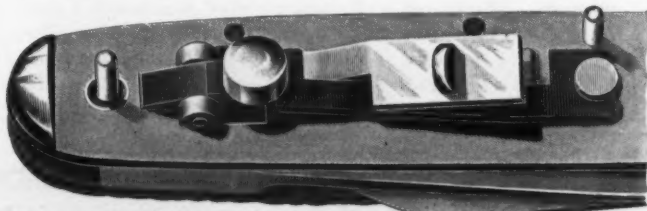


Fig. 2.—Mechanism of Safety Lock Press Button Knife.

and the button pressed with the thumb as the knife lays in the hand. The point is made that there is no risk of breaking finger nails in opening the knife. It is described as made of the finest hand hammered English blade cutlery steel, beautifully fitted and finished.

Vulcan-Set Paint Brushes.



Vulcan-Set Paint Brush.

The brush illustrated herewith is designated as the Vulcan Set, and is made without nails or tacks. The bristles are set in such a way that, it is stated, it is impossible for them to be pulled out. Another feature of the brush is a bridle extending 1 in. below the cap, which serves to hold the bristles in position. It is claimed for the brushes that they can be used in water, alcohol, benzine or turpentine mixtures; that nothing but acids or alkalis that actually burn bristles can injure them; that they will stand any climate, wet or dry, and any degree of heat that will not destroy the bristles. This style of brush is made for use in paint, varnish, kalsomine and whitewash, and the one illustrated is a wall paint brush. The brushes are made by the John L. Whit-

ing-J. J. Adams Company, Boston, Mass.

Some New Brown & Sharpe Small Tools.

The Brown & Sharpe Mfg. Company, Providence, R. I., has brought out a number of new small tools, which are important additions to its extensive lines. They include a heavy micrometer caliper, improved toolmakers' clamp, tubular inside micrometer, bevel edge square, an indicator, redesigned surface gauge, hight gauge attachment, tempered steel rules and automatic center punch, all of which are shown in the illustrations.

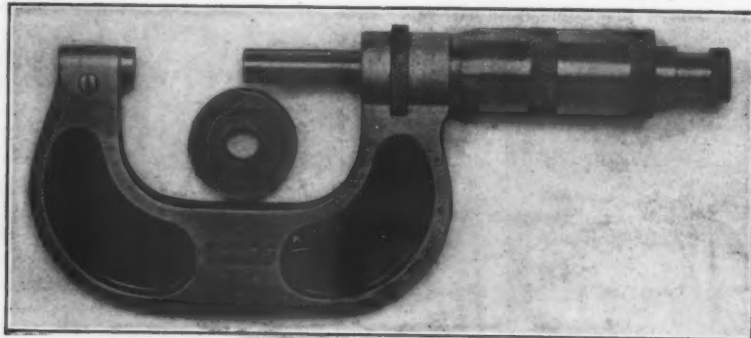


Fig. 1.—Heavy Micrometer Caliper.

THE HEAVY MICROMETER CALIPER, Fig. 1, is designed for use of workmen desiring an accurate instrument for constant and severe usage, as, for example, in the grinding room, where the micrometer is subjected to unfavorable conditions, such as water and grit, coupled with the frequent necessity of taking measurements with the clamp ring set. The frame of the micrometer is a heavy I section of special design to give strength and rigidity. The spindle and threaded portion are of larger diameter than is usual, giving greater stiffness and insuring longer life to the screw under adverse conditions, because of the

signed for taking inside measurements, as in measuring rings, cylinders, in setting gauges, comparing gauges and similar work. Each gauge has a movement of 1 in., and the line contains 32 different sizes, covering a range from 8 to 40 in. The gauge consists of a tube, or holder, with a 1-in. micrometer head on one end and a fixed measuring point on the other. The measuring points are hardened and ground on a radius, adapting the tool for measuring both parallel and curved surfaces. Adjustment is provided to compensate for wear. A clamp screw securely clamps the spindle and preserves the setting.

Each gauge has a fiber handle, which protects it from the varying temperature of the hand.

HARDENED SQUARES WITH BEVELED EDGES, designed primarily for toolroom use and for other purposes where requirements are most exacting, have their blades beveled on both edges of each side, as shown in Fig. 3, thus furnishing practically a line contact, with the work under observation, which makes possible the detection of slight errors. A recess in the beam at the base of the inside edge of the blade enables the user to remove dust and dirt easily from the corner of the square and so obtain



Fig. 2.—Tubular Inside Micrometer Gauge.

larger bearing surface for the threads. The screw is encased and protected from grit, dirt and injury. The clamp ring illustrated securely clamps the spindle in any desired position. Provision is made for adjustment to compensate for wear. The thimble of the caliper is of unusually large diameter, making the thousandths graduations more distinct and more easily read. Each

exact results. The tool is made with great accuracy. The beams and edges of the blade are hardened and accurately ground for parallelism, and every precaution is taken to insure the right angle of blade and beam. The square is made in four sizes, the relation of blade and beam being $1\frac{1}{2} \times 1$ 9-16 in., 3×2 7-16 in., $4\frac{1}{2} \times 3$ 9-16 in., $6 \times 4\frac{1}{2}$ in., the length of blade being from the inner edge of beam.

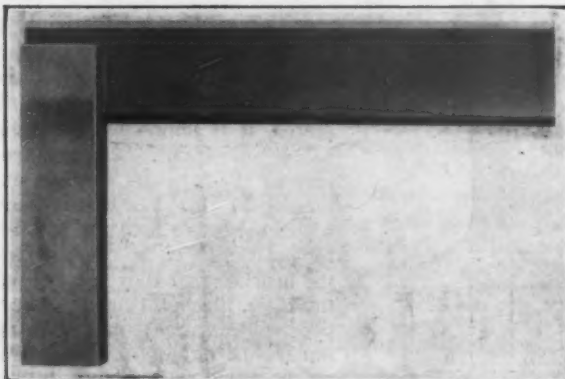


Fig. 3.—Hardened Square with Beveled Edge.

instrument is provided with a specially designed ratchet stop. It is made in three sizes, with ranges 0 to 1 in., 1 to 2 in. and 2 to 3 in.

THE TUBULAR INSIDE MICROMETER GAUGE, illustrated in Fig. 2, is essentially new in design, being made of tubing, which renders it very light and convenient to handle, especially in the longer lengths. They are de-

IMPROVED TOOLMAKERS' CLAMP.—This clamp, Fig. 4, differs from the regular line in that it is provided with a spring attachment, constituting an entirely new feature in tools of the type. The attachment is fastened to the sliding jaw, and prevents it dropping while inserting or removing work, thus forming a very convenient adjunct, especially where a large quantity of pieces of the same size are to be clamped for drilling, for it holds the jaws at the required distance for removing and inserting each piece. The clamps are of case hardened steel, proportioned to insure the greatest strength. The jaws are round on the ends to permit clamping under a shoulder or in a recess. The screws are of comparatively fine pitch to give ample leverage. The tool is made in five sizes, the opening and length of jaws being, respectively, $\frac{3}{4}$ in. and $1\frac{1}{2}$ in.; $1\frac{1}{8}$ in. and $2\frac{1}{8}$ in.; $1\frac{3}{8}$ in. and $2\frac{3}{8}$ in.; 2 in. and $3\frac{1}{8}$ in.; and $2\frac{1}{2}$ in. and 4 in.

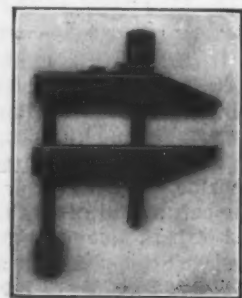


Fig. 4.—Improved Toolmakers' Clamp.

THE B. & S. INDICATOR, shown in Fig. 5, is new in design, and is intended for use in setting centrally any point or hole in a piece of work to be operated upon in a lathe or on a face plate, as well as for testing lathe centers, the inside and outside diameter of pulleys, cylinders and work of a similar nature. The point which bears against the work is of hardened steel ground spherical, allowing pressure to be brought upon it from any direction and readings obtained on a scale at the top



Fig. 5.—B. & S. Indicator.

of the case, which registers the movement by means of a pointer. The scale is graduated to thousandths of an inch and reads to .007 in either side of zero. The shank is of case hardened steel, and can be inserted readily in the tool post of a lathe. The head may be adjusted either above or below center within a range of 30 degrees by means of a swivel joint at one end of the shank.

THE NEW UNIVERSAL SURFACE GAUGE, Fig. 6, while embodying all the important features in gauges of previ-

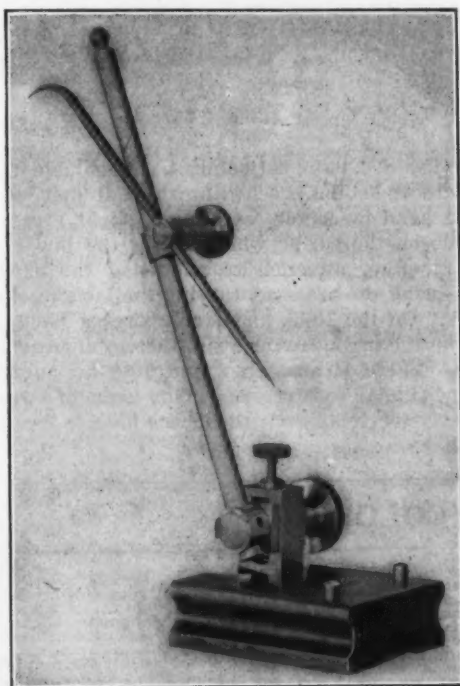


Fig. 6.—Universal Surface Gauge.

ous design, contains in addition a new and valuable device—a fine adjustment for the spindle after it has been set and the scriber clamped at the approximate height. The movement of the adjustment is always vertical, and

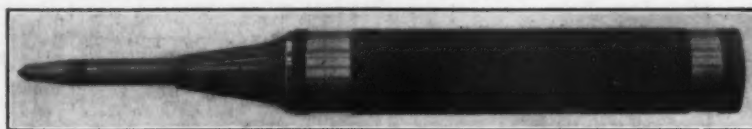


Fig. 9.—Heavy Automatic Center Punch.

the device is simple and convenient. The base is case hardened steel. A V-shaped groove at the bottom adapts it for cylindrical work. There are two gauge pins at the rear, which can be pushed down and used against the edge of a plate or the side of a T-slot. The spindle swivels can be securely clamped in any position from the vertical to the horizontal, and the scriber used below

the base as a depth gauge. For small work the spindle may be removed and the scriber inserted in a hole provided, where it is easily adjusted. The tool is made with 9 and 12 in. spindle and, with heavy base, with 12-in. spindle, and also with a 12-in. and 18-in. spindle.

THE HEIGHT GAUGE ATTACHMENT, illustrated in Fig. 7, is designed for use in connection with the Brown & Sharpe inside micrometer gauge and is especially useful when it is desired to obtain heights of projections on plane surfaces, the location of bushings in jigs, &c. With it measurements can be accurately obtained, ranging from 2 to 9½ in., 50 to 230 mm. The measuring rod is inserted upward through the base and clamped securely by turning the knurled nut. The micrometer is then adjusted and clamped to the upper end of the rod. The base is case hardened and mottled. A V-shaped groove in the bottom adapts it for cylindrical work.



Fig. 7.—Height Gauge Attachment.

THE TWO TEMPERED STEEL RULES, which are shown in Fig. 8, with beveled edges, are advantageous to the tool maker and draftsman in laying out fine work where close measurements are required. They are beveled on both edges of one side only and are graduated on the beveled edges. The tempered steel rules with

figured graduations are convenient, inasmuch as the 64ths graduations are numbered every eighth line, as 8, 16, 24, 32, &c., which assists greatly in reading them. The rules are graduated on the remaining edges to 8ths, 16ths and 32ds of an inch. Both of the new rules are made in nine sizes, from 1 to 24 in.

THE HEAVY AUTOMATIC CENTER PUNCH, illustrated in

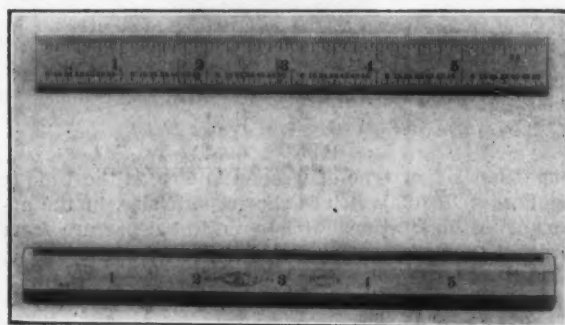


Fig. 8.—Tempered Steel Rules.

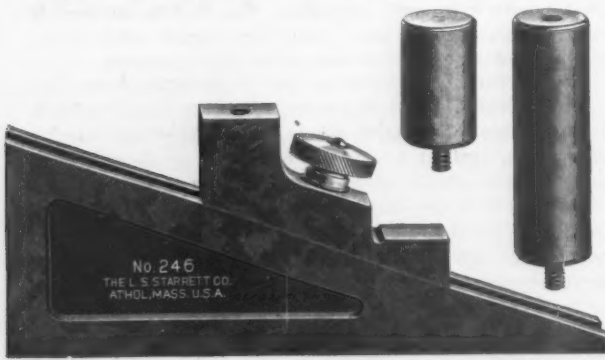
Fig. 9, is of much heavier construction than previous sizes and is designed for use in rolling mills for testing the hardness of metal. It is also useful in hardening rooms for testing the variation in depth of case hardening. It is suitable for laying out work to be drilled, where a smaller size would not strike a sufficiently heavy blow.

Planer and Shaper Gauge.

The L. S. Starrett Company, Athol, Mass., and 132 Liberty street, New York, is making the planer and shaper gauge, No. 246. It is made of steel, drop forged,

and is designed for obtaining different heights on a planer. The gauge will measure from ½ to 5½ in. It is likewise serviceable on other tools; for example, on machines where slots are being milled. The gauge can be inserted in the slot and by sliding the block on the wedge a perfect fit is obtained. Then the tool may be withdrawn and the exact measurement ascertained by using a mi-

rometer. When an accurate dimension is desired the tool may be first set by the micrometer and used as a



Planer and Shaper Gauge.

standard gauge. The instrument is case hardened, finely finished and useful for planer and milling machine work.

The New Shattuck Vest Pocket Pistol.

The C. S. Shattuck Arms Company, Hatfield, Mass., manufacturer of double and breech loading shotguns, has



The New Shattuck Vest Pocket Pistol.

brought out a new type of weapon known as the Unique Vest Pocket Pistol, which is shown, half size, in the accompanying illustration. It is a radical departure from the usual type of pocket pistol, being a serviceable arm, intended for self-defense. While little larger than a watch and occupying no more room in the pocket, it is of .22 caliber and holds four cartridges, which can be dis-

charged in one second. It is double acting and strongly constructed. It may be carried in the hand without detection and fired without raising the hand or from the pocket, if necessary. There is no danger of accidental discharge, as it requires the full sweep of the trigger to cause explosion. The illustration shows the .22 caliber, but the company plans to manufacture it also in .25 and .32 calibers.

The Wright Wrench.

The Wright Wrench Company, Canton, Ohio, has put on the market the Wright Wrench made in 6, 8, 10, 12, 15 and 18 in. sizes. The one piece handle and bar is drop forged from 0.20 carbon open hearth steel and carbonized, mottled and hardened. The jaw of semisteel, rack and pawl of cold rolled steel are also carbonized, mottled and hardened. The spring of high grade steel is oil tempered and the screw case hardened. The wrench is first milled, ground and polished, then mottled to resist rust. A needle round edge is put on both racks and pawls to obtain a ball bearing effect. The racks are interchangeable and may be readily renewed if necessary. The first four sizes have a 3-64 in. adjustment; the 15 and 18 in.



Wright All-Steel Wrench.

sizes having a 1-16-in. adjustment. A notable feature of the wrench is the ease with which it may be used with one hand by merely exerting a slight pressure of the thumb on the spring which causes the jaw to slide readily in either direction regardless of the pawl and rack, releasing the pressure, causing the jaws to close on the work. On the 10-in. and larger sizes a fillet is left to back up the main jaw or head, thereby increasing the strength. There is also an 8 and 10½ in. automobile wrench of similar construction. This make of wrench is particularly serviceable where but one hand is free, as for linemen.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	gal.	bbl. lots.
Linseed, Western, Raw.....	57 @58	
State, Raw.....	57 @58	
City, Raw.....	58 @59	
Boiled, 1½ gal. advance on Raw.		
Raw, Calcutta, in bbls.....	75 @76	
Lard, Prime, Winter.....	80 @83	
Extra No. 1.....	82 @83	
No. 1.....	47 @49	
Cotton-seed, Crude, f.o.b. mill, 35 @36		
Summer, Yellow, prime.....	5.85 @5.90	
Summer, White.....	6.10 @6.30	
Yellow, Winter.....	6.05 @6.40	
Tallow, Acidless.....	58 @59	
Menhaden, Brown, Strained.....	32 @33	
Northern, Crude.....	22 @23	
Southern.....	22 @23	
Light Strained.....	32 @33	
Bleached Winter.....	36 @37	
Extra Bleached Winter.....	38 @39	
Cocanut, Ceylon.....	7 @7	
Cochin.....	8 @8	
Cod, Domestic, Prime.....	38 @39	
Newfoundland.....	40 @41	
Red, Elaine.....	43 @47	
Saponified.....	5½ @6½	
Olive, Yellow.....	1.40 @1.50	
Neatfoot, Prime.....	55 @56	
Palm, Lagos.....	5.00 @5.65	

Mineral Oils—

Black, 28 gravity, 25 @30 cold test.....	12½ @13
28 gravity, 15 cold test.....	13½ @13½
Summer.....	12 @12½
Cylinder, light filtered.....	20 @20½
Dark, filtered.....	17½ @18
Paraffine, 90-90 sp. gravity.....	14 @14½
90 sp. gravity.....	13 @13½
83 sp. gravity.....	10½ @11
Red.....	13 @13½

Miscellaneous—

Barites:	
White, Foreign.....	ton \$18.50 @20.50
Amer., floated.....	ton 17.00 @18.00
Off color.....	ton 12.50 @15.00
Chalk in bulk.....	ton 3.00 @3.10

China Clay, Imported.....	ton 11.50 @18.00
Cobalt, Oxide.....	100 lb. 1.45 @2.60
Whiting, Commercial.....	100 lb. 45 @50
Gilders.....	100 lb. 52 @64
Ex. Gilders.....	100 lb. 56 @68

Putty, Commercial—

In bladders.....	\$1.70 @2.00
In bbls. or tubs, 100 lb.....	1.20 @1.45
In 1 lb to 5 lb tins.....	2.65 @3.25
In 1½ to 50 lb tins.....	1.50 @1.90

Spirits Turpentine—

In Machine bbls.....	42 @42½
In Oil bbls.....	42½ @43

Glue—

Cabinet.....	12 @15
Common Bone.....	7½ @9
Extra White.....	18 @24
Fish, liquid, 50 gal. bbls., per gal. ton.....	60 @120
Foot Stock, White.....	12 @14
Foot Stock, Brown.....	9 @11
German Common Hide.....	10 @12
German Hide.....	12 @18
French.....	10 @10
Irish.....	13 @16
Low Grade.....	10 @12
Medium White.....	14 @19

Gum Shellac—

Bleached, Commercial.....	16 @16½
Bone Dry.....	20 @21
Button.....	20 @20
Diamond I.....	27 @28
Fine Orange.....	20 @21
A. C. Garnet.....	15½ @16
Light Orange.....	17 @19
Kala, Button.....	10 @11
D. C.....	27 @28
Octagon B.....	22 @23
T. N.....	14 @15
V. S. O.....	25 @26

Colors in Oil—

Black, Lampblack.....	12 @14
Blue, Chinese.....	36 @46
Blue, Prussian.....	32 @36

Blue, Ultramarine.....	13 @16
Brown, Vandyke.....	11 @14
Green, Chrome.....	12 @16
Green, Paris.....	24 @24
Sienna, Raw.....	12 @15
Sienna, Burnt.....	12 @15
Umber, Raw.....	11 @14
Umber, Burnt.....	11 @14

White and Red, Lead &c.—

Lead, English white, in Oil, 10% @10%	
Lead, American White:	
Dry and in Oil, 100, 250 and 500 lb kegs.....	6%
Dry and in Oil, 25 and 50 lb kegs.....	7
Dry and in Oil, 12½ lb kegs.....	7½
In Oil, 25 lb tin pails.....	7½
In Oil, 12½ lb tin pails.....	7½
In Oil, 1, 2, 3 and 5 lb tin cans, asst.....	8%
Red Lead and Litharge:	
In 100 lb kegs.....	7
In 25 and 50 lb kegs.....	7½
In 12½ lb kegs.....	7½
In lots of less than 500 lbs, ¼¢ lb advance over above prices of White and Red Lead and Litharge.	
Lead, American, Terms: On lots of 500 lbs and over, 60 days, or 2% for cash if paid in 15 days from date of invoice.	

Zinc, Dry—

American, dry.....	54 @54
Red Seal (French process).....	64 @7
Green Seal.....	74 @74
German Red Seal (French process).....	7 @74
Green Seal.....	74 @74
White Seal.....	84 @9
French, Red Seal.....	84 @84
Green Seal.....	10% @10%

Dry Colors—

Black, Carbon.....	64 @10
Black Drop, American.....	34 @8

Black Drop, English.....	5 @15
Black, Ivory.....	16 @20
Lamp, commercial.....	4 @6
Blue, Celestial.....	4 @6
Blue, Chinese.....	30 @31
Blue, Prussian, Domestic.....	28 @30
Blue, Ultramarine.....	5 @15
Brown, Spanish.....	¼ @1
Carmin, No. 40.....	\$3.00 @3.10
Green, Chrome, ordinary.....	3½ @5
Green, Chrome, pure.....	17 @25
Ocher, American.....	ton \$12.00 @15.00
American Golden.....	4 @5
French.....	14 @2
Foreign Golden.....	3 @4
Orange Mineral, English.....	10 @12
French.....	12½ @13
German.....	12 @13
American.....	8½ @10
Red, Indian, English.....	5 @7
American.....	3 @3½
Red, Turkey, English.....	4 @10
Red, Tuscan, English.....	7 @10
Red, Venetian, Amer.....	100 lb \$0.75 @1.50
English.....	100 lb \$1.15 @1.60
Sienna, Italian, Burnt and Powdered.....	3 @9
Italian, Raw, Powdered.....	3 @9
American, Raw.....	24 @3
American Burnt and Pow'd.....	24 @3
Talc, French.....	ton \$18.00 @25.00
American.....	ton 15.00 @25.00
Terra Alba, French.....	100 lb .80 @1.00
English.....	100 lb .90 @1.00
American.....	100 lb, No. 1, .75 @.80
American.....	100 lb, No. 2, .60 @.65
Umber, Tkey, Bnt. & Pow.....	2 @3
Turkey, Raw and Powdered.....	2 @3
Burnt, American.....	2 @24
Raw, American.....	2 @24
Yellow, Chrome, Pure.....	12½ @14
Oxide Red, American.....	2 @74
Vermilion, English, Imported.....	@70
Chinese.....	\$0.90 @1.00

Current Hardware Prices.

General Goods.—Goods which are made by more than one manufacturer are printed in *Italics*. The prices named represent those obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are usually given to larger buyers.

Special Goods.—Quotations printed in small type (Roman) relate to goods of particular manufacturers, who request the publication of the prices named and are responsible for their correctness. They usually represent the prices to the small trade, lower prices being generally obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33 1/2 @ 33 1/2 & 10% signifies that the price of the goods in question ranges from 33 1/2 per cent. discount to 33 1/2 and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued annually, a book of 376 pages, which is sent free of charge to every subscriber to *The Iron Age*. It gives a classified list of the products of our advertisers and thus serves as an up-to-date DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists," 218 pages, price \$2, prepaid, contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Columbian and Domestic.....33 1/2 @
North's.....10%
Upson's Patent, 1/2 doz., \$29.90.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....10%
Ives' Stop Head Screws and Washers.....10%
Tapiun's Perfection.....10%

Ammunition—See Caps, Cartridges, Shells, &c.

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, 1/2 doz. pairs, Nos. 1, \$0.75; 2, \$0.60; 4, \$1.00; 5, \$0.50.
Fernald Quick Shifter, 1/2 doz. pairs.....\$2.00@3.00

Anvils—American—

Eagle Anvils.....1/2 lb. @ 9¢
Hay-Budden, Wrought.....9¢@9 1/2¢
Trenton.....1/2 lb. @ 9 1/2¢

Imported—

Swedish Solid Steel Paragon, 1/2 lb.....10¢@10 1/2¢
Swedish Solid Steel Sisco, Superior, 1/2 lb.....10¢@10 1/2¢
1 lb. Wright & Sons, 1/2 lb. 81 to 319 lb., 11¢; 350 to 600 lb., 11 1/2¢.

Anvil, Vice and Drill—
Miller Falls Co., \$18.00.....15¢@10%

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths—
Livingston Nail Co.....10%

Augers and Bits—

Com. Double Spur.....30%
Jennings' Patn., Bright.....65¢@70¢
Black Lip or Blued.....65¢@65 1/2¢
Boring Mach. Augers.....70%
Car Bits, 12-in. twist.....40¢@50¢
Ford's Auger and Car Bits.....40¢@50¢
Ft. Washington Auger Co., Concord's.....35%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co., No. 10 ext. lip, R. Jennings' list.....25¢@7 1/2¢

No. 30, R. Jennings' list.....25¢@7 1/2¢
Russell Jennings.....25¢@10¢
L'Hommiedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....50%
Swan's.....65¢@10¢
Swan's, Jennings' Pattern.....50%
Wright's Jennings' Bits.....50%

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's Pattern, No. 1, 1/2 doz., \$25; No. 2, \$18; No. 3, \$10; No. 4, \$5.
Ford's, Clark's Pattern.....60¢@60¢
C. E. Jennings & Co., Steer's Pat. 25¢
Layvine Pat., small size, \$18.00; large size, \$26.00.....60¢@10%
Swan's.....60%

Gimlet Bits—

Common Dbl. Cut.....\$3.00@3.25
German Pattern, Nos. 1 to 10, \$4.75; 11 to 13, \$5.75

Hollow Augers—

Bonney Pat., per doz., \$5.50@6.00
Ames.....20¢@10%
Universal.....20%
Ship Augers and Bits—
Ship Augers.....40¢@10¢
Ford's.....35¢@5%
C. E. Jennings & Co., L'Hommiedieu's.....6%
Watrous's.....35¢@18%
Snell's.....18%

Awl Hafts—See Handles, Mechanics' Tool.

Awls—

Brad Awls:
Handled.....gro. \$2.75@3.00
Unhanded, Shiddered.....gro. 65¢@66¢
Unhanded, Patent.....gro. 60¢@70¢
Peg Awls:
Unhanded, Patent.....gro. 31¢@34¢
Unhanded, Shiddered.....gro. 65¢@70¢
Scratch Awls:
Handled, Com.....gro. \$1.50@1.00
Handled, Sine.....gro. \$1.10@1.20
Elmore Tool Mfg. Co., Thinners and Brad Awls.....55¢@7%
Scratch Awls.....60%

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Single Bit, base weights: Per doz.
First Quality.....\$4.75@5.00
Second Quality.....\$4.25@4.50
Double Bit, base weights:
First Quality.....\$7.00@7.50
Second Quality.....\$6.50@6.75

Axle Grease—

See Grease, Axle.

Axles—

Concord, Loose Collar.....4 1/4¢@4 1/2¢
Concord, Solid Collar.....4 1/4¢@4 1/2¢
No. 1 Common, Loose.....3 1/4¢@3 1/2¢
No. 1 1/2 Com., New Style.....4 1/4¢@4 1/2¢
No. 2 Solid Collar.....4 1/4¢@4 1/2¢
Half Patent:
Nos. 7, 8, 11 and 12.....70%
Nos. 13 to 14.....70%
Nos. 15 to 18.....70¢@10¢@10 1/2¢
Nos. 19 to 22.....70¢@10¢@10 1/2¢

Boxes, Axles—

Common and Concord, not turned.....lb., 5¢@6¢
Common and Concord, turned, lb., 6¢@7¢
Half Patent.....lb., 9¢@10¢

Bait—

Fishing:
Hendry's.....20%
A Bait.....25%
Competitor Bait.....20¢@5%

Balances—

Caldwell new list.....50¢@10%
Fullman.....50¢@10%

Spring—

Light Spring Balances.....60¢@60 1/2¢
Chatillon's.....50¢@50 1/2¢
Light Spg. Balances.....50¢@50 1/2¢
Straight Balances.....40¢@40 1/2¢
Circular Balances.....50¢@50 1/2¢
Large Dial.....30%

Barb Wire—See Wire, Barb.

Bars—

Steel Crochbars, 10 to 40 lb., per lb., 2 1/4¢@2 1/2¢

Towel—

No. 10 Ideal, Nickel Plate.....1/2 doz. \$8.50

Beam, Scale—

Scale Beams.....40%
Chatillon's No. 1.....40¢@40 1/2¢
Chatillon's No. 2.....30%

Beaters, Carpet—

Holt-Lyon Co., No. 12 Wire Coppered 1/2 doz. \$0.80; Tinned.....\$0.85
No. 11 Wire Coppered 1/2 doz. \$1.15; Tinned.....\$1.20
No. 10 Wire Tinned.....1/2 doz. \$1.50

Beaters Egg—

Dover Stamping & Mfg. Co., No. 1, Genuine Dover, per gro., No. 1, Tumbler Size, \$7.50; No. 2, Family Size, \$7.50; No. 3, Extra Family Size, \$24.00; No. 4, Hotel Size, \$30.00.
Holt-Lyon Co., No. 5, Jap'd. \$0.80; No. A, Jap'd. \$1.15; No. B, Jap'd. \$1.85; No. 6, Jap'd. \$1.65.
Lyon, Jap'd., per doz., No. 2, \$1.35.
Tapiun Mfg. Co., Improved Dover, per gro., No. 60, \$4.00; No. 75, \$6.50; No. 100, \$7.00; No. 102, Tin'd. \$8.50; No. 150, Hotel, \$15.00; No. 152, Hotel Tin'd. \$17.00; No. 200, Tumbler, \$3.50; No. 302, Tumbler Tin'd. \$9.50; No. 300, Mammoth, per doz., \$25.00.

Bellows—

Blacksmith Standard List:
Split Leather.....60¢@10¢@65%
Grain Leather.....50¢@60¢@10%
Hand:
Inch.....6 7 8 9 10
Doz.....\$5.00 5.50 6.00 6.50 7.50

Molders—

Inch.....10 12 14 16
Doz.....\$7.50 9.00 12.00 15.00

Bells—

Cow—
Wrought Cow Bells.....75%
Jersey.....75¢@10%
Texas Star.....50%

Door—

Home, R. & E. Mfg. Co.'s.....55¢@10%

Hand—

Polished, Brass.....60¢@60 1/2¢@10%
White Metal.....60¢@60 1/2¢@10%
Nickel Plated.....50¢@10%
Screws.....50¢@10%
Cone's Globe Hand Belts.....33¢@35%

Miscellaneous—

Farm Bells.....lb., 2 1/4¢@2 1/2¢
Church and School.....60¢@60 1/2¢@10%

Belting—

Leather—
First Quality, Ex. Hy., Strictly Short Lap.....60¢@10%
Standard.....70¢@10¢@70¢@10 1/2¢
Light Double.....75¢@10%
Cut Leather Lacing.....45¢@50%
Leather Lacing Sides, per sq. ft. 85¢

Rubber—

Competition (Low Grade).....70¢@10¢@75%
Standard.....60¢@10¢@70%
Best Grades.....40¢@50%

Bench Stops—

See Stops, Bench

Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters.....25%
Bicycle Goods—
John S. Leng's Son & Co.'s 1908 list:
Chain, Parts, Spokes.....30%
Tubes.....60%
Bits—
Auger, Gimlet, Bit Stock Drills, &c.—See Augers and Bits.

Blocks Tackle—

Common Wooden.....75¢@75 1/2¢
L. & B. Co., Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50¢@10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50¢@10%; Wire Rope Snatch, 50%
Lane's Patent Automatic Lock and Junior.....30%
See also Machines, Hoisting.

Boards, Stove—

Paper and Wood Lined.....55%
Embossed.....55%

Boards, Wash—

See Washboards.

Bobs, Plumb—

Keniff & Esser Co.....33 1/2¢@10%

Bolts

Carriage, Machine, &c.—
Common Carriage (cut thread):
1/2 x 6 and smaller.....75¢@10%
Larger and longer.....70¢@10%
Common Carriage (rolled thread):
1/2 x 6, smaller and shorter.....75¢@10%
Phila. Eagle, \$3.00 list.....80¢@10%
Bolt Ends, with C. & T. Nuts, 70¢@10%

Machine (Cut Thread):

1/2 x 4 and smaller.....75¢@10 1/2¢
Larger and longer.....70¢@10 1/2¢

Door and Shutter—

Cast Iron Barrel, Japanned, Round Brass Knobs:
Inch.....3 4 5 6 8
Per doz. \$0.30 .35 .45 .60 .80
Cast Iron Spring Foot, Jap'd.:
Inch.....6 8 10
Per doz.....\$1.20 1.50 2.25
Cast Iron Chain, Flat, Japanned:
Inch.....6 8 10
Per doz.....\$1.00 1.40 1.65
Cast Iron Flat Shutter, Jap'd., Brass Knobs:
Inch.....6 8 10
Per doz.....80.75 .95 1.25

Wrought Barrel Japanned.

Barrel Bronzed.....60¢@10%
Spring.....70¢@10¢@70¢@10 1/2¢
Shutter.....50¢@50 1/2¢@10 1/2¢
Square Neck.....75¢@10%
Square.....70¢@10¢@10 1/2¢@90%

Ives' Mortise—

Ives' Wrought Metal.....10%

Expansion—

F. H. Evans' Crescent.....10¢@10%
Richards Mfg. Co.....55¢@10%
Star Expansion Bolt Co.:
Star, Lag Screw Type.....60¢@10 1/2¢@3%
Star, Wood Screw Type.....40%
Star, Machine, Single Wedge.....60%

Star, Machine, Double Wedge.....60%
Steward & Kousner Mfg. Co.:
Style No. 13, Double.....60%
Style No. 1, Single.....60%
Style No. 100, Dbl. Jaw, Single.....55%
Lag Screw.....66 1/2%

Plow and Stove—

Plow.....65¢@50¢@70%
Stove.....85¢@85 1/2¢

Tire—

Common Iron.....80%
Norway Iron.....80%
American Screw Co.:
Norway Phila., list Oct. 16, '94.....50%
Eagle Phila., list Oct. 16, '94.....50%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '94.....80%
Eagle Phila., list Oct. 16, '94.....80%
Eclipse, list Dec. 28, '99.....80%
Russell, Burdall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct. '91.....80%
Eagle.....82 1/2%
Shelton Co.:
Tiger Brand, list Dec. 28, '99.....80%
Phila., Eagle, list Oct. 16, 1891.....82 1/2%
Upson Nut Co.:
Tire Bolts.....72 1/2%

Borers, Bung—

Borers Bung, Ring, with Handle:
Inch.....1 1/2 1 3/4 2
Per doz.....\$4.80 5.60 6.40 8.00
Inch.....2 1/4 2 1/2
Per doz.....\$8.65 11.50
Enterprise Mfg. Co., No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.50 each.....25%

Boxes, Mitre—

C. E. Jennings & Co.....25%
Langdon, New Langdon and Langdon Improved. 20¢@10%; Langdon Acme.....15¢@10%
Perfection.....40%
Seavey.....45%

Braces—

Common Ball, American \$1.50@1.75
Barber's.....50¢@10¢@60¢@10%
Fray's Genuine Spindle.....60%
Fray's No. 61, 106, 206, 614.....50%
C. E. Jennings & Co.....50¢@5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat.....50%
Miller Falls Drill Braces.....25¢@10%
P. S. & W. Co., Peck's Pat.....60¢@10%

Brackets—

Wrought Steel.....80¢@80 1/2¢
Bradley Metal Clasp.....80¢@10¢@10 1/2¢
Griffin's Pressed Steel.....75¢@75 1/2¢
Griffin's Folding Brackets.....70¢@10%
Stanley's Pressed Steel.....80%
Stanley's Folding Brackets.....70¢@10 1/2¢
Tapiun Victor Handy Egg Beater Bracket.....1/2 doz. \$1.50

Bright Wire Goods—

See Wire and Wire Goods.

Stroilers—

Kilbourne Mfg. Co.....75¢@20%
Wire Goods Co.....75%

Buckets, Galvanized—

Mfr's list, price per gross.
Quart.....10 12 14
Water, Light.....\$28.35 30.75 34.75
Water, Ex. Hvy.....46.85 49.85 53.25
Fire, Rd. Btm. \$3.50 35.90 39.90
Well.....37.35 41.35 45.35

Bull Rings—See Rings, Bull.

Butts—

Brass.....65%
Cast Brass, Tiebout's.....40¢@10%

Cast Iron—

Fast Joint, Broad.....40¢@10¢@50%
Fast Joint, Narrow.....40¢@10¢@50%
Loose Joint.....70¢@10¢@75%
Loose Pin.....70¢@10¢@75%
Mayer's Hinges.....70¢@70 1/2¢
Parliament Butts.....70¢@70 1/2¢

Wrought Steel—

BRIGHT.
Light Narrow, Light Reversible.....75¢@5%
Reversible and Broad.....75¢@10%
Loose Joint, Narrow, Light Inside Blind, &c.....75%
Back Flaps, Table Chest.....70%
BRONZED.
Light Narrow, Loose Pin.....55%
Light, Loose Pin, Ball Tip.....65%
Broad.....55%

Extra, 5¢

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, net list; 1200, 15%; 200, 300, 500
Hendryx Bronze: Series 700, 800, 30%
Hendryx Enamelled.....35%

Calipers—See Compasses.**Calks, Toe and Heel—**

Blunt, 1 prong, per 100 lb., \$3.50 @ \$3.85

Sharp, 1 prong, per 100 lb., \$4.00 @ \$4.35

Burke's, 1 pg. Blunt Toe, 3/4"; 2 pg. Blunt Toe, 4/4"; 1 pg. Sharp Toe, 4/4"; 2 pg. Sharp, 4/4"; Blunt Heel, 4/4"; Sharp Heel, 4/4"; Lautier, Blunt, 4/4"; Sharp, 4/4"; Perkins, Blunt, 1 lb, 3.55; Sharp, 4.15

Can Openers—

See Openers, Can.

Caps, Percussion—

Eley's E. B.52 @ 55¢
G. D.per M. 34 @ 35¢
F. L.per M. 40 @ 42¢
G. E.per M. 48 @ 50¢
Musketper M. 62 @ 63¢

Primers—

Berdan Primers, \$2 per M. 2045%
Primer Shells and Bullets. 15410%
All other primers per M. \$1.52 @ 1.60

Carpet Stretchers—

See Stretchers, Carpet.

Cartridges—

Blank Cartridges:
32 C. F., \$5.501045%
38 C. F., \$7.001045%
22 cal. Rim, \$1.501045%
32 cal. Rim, \$2.751045%
B. B. Caps, Con. Ball, Sngd. \$1.19
B. B. Caps, Round Ball.\$2.49
Central Fire.25%
Target and Sporting Rifle. 15410%
Primed Shells and Bullets. 15410%
Rim Fire, Sporting.50%
Rim Fire, Military.1545%

Castors—

Bed65 @ 10 @ 70%
Plate60 @ 6045%
Philadelphia70 @ 10 @ 75%
Acme, Ball Bearing.35%
Gem (Roller Bearing).70 @ 10 @ 1045%
Steel Gem (Roller Bearing).70%
Standard Ball Bearing.45%
Yale (Double Wheel) low list. 60410%

Cattle Leaders—

See Leaders, Cattle.

Chain, Proof Coil—

American Coil, Straight Link:
3 1/2 1/4 5 1/8 3/4 1 1/2 5/8
\$7.45 4.90 3.65 3.25 3.10 3.00
2 1/2 1 1/4 1 1/8 1 1/2 1 1/4 1 1/8
\$2.90 3.00
Lower prices in case lots f.o.b. factory.

German Coil7045%
German Pattern Coil:
6-0 to 17041045%
2 and 360410410 @ 70%
4, 5 and 65041045041045%

Halter—

Halter Chains6045 @ 60410%
German Pattern Halter Chains
List July 23, '077045%
Covert Mfg. Co.3545%
Halter3545%

Cow Ties—

See Ties, Cow and Ties.

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6 1/2-6 3/4, Straight, with ring, \$26.00
6 1/2-6 3/4, Straight, with ring, \$27.00
6 1/2-6 3/4, Straight, with ring, \$30.00
6 1/2-6 3/4, Straight, with ring, \$35.00
NOTE—Add 20¢ per pair for Hooks
Twist Traces: add per pair for Nos. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

Eastern Standard Traces, Wagon Chain, &c.70410 @ 70%

Miscellaneous—

Jack Chain:
Iron6041045 @ 60410410%
Brass60%
Safety and Plumbers' Chain. 75%
Gal. Pump Chain.1b, 4 1/2 @ 5%
Bridgeport Chain Co.:
Triumph Halter and Coll. 3545 @ 40%
Triumph Dog40410400%
Brown Halter and Coll.354545%
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion40%
Oneida Community:
American Halter, Dog and Kennel Chains354545 @ 40%
Niagara Dog Leads and Kennel Chains45454545%
Wire Goods Co.:
Dog Chain70%
Universal Dbl.-Jointed Chain.70%
Chain and Ribbon, Sash—
Oneida Community:
Steel Chain.60%
Pullman:
Bronze Chain, 60%; Steel Chain, Coppered60410%
Sash Chain Attachments, per set. \$4
Aluminum Sash Ribbon, per 15 ft. \$2.00 @ \$3.00
Sash Ribbon Attachments, per set. \$4

Chalk—

Carpenters' Bluegro., 50 @ 55¢
Carpenters' Redgro., 50 @ 55¢
Carpenters' Whitegro., 10 @ 15¢

Checks, Door—

Hartley's45%
Pullman, per doz.\$4.50
Russwin3545%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools55%
Youths' Chests, with Tools40%
Gentlemen's Chests, with Tools30%
Farmers' Chests, etc., Chests, with Tools20%
Machinists' and Pipe Fitters' Chests, Empty45%
Tool Cabinets45%
C. E. Jennings & Co.'s Machinists' Tool Chests74%

Chisels—

Socket Framing and Firmer Standard List. 80410 @ 80410410%
Buck Bros.30%
C. E. Jennings & Co.:
Socket Firmer No. 1025474%
Socket Framing No. 1525474%
Swan's66470%
L. & I. J. White & Co.30 @ 3045%

Tanged—

Buck Bros.3045 @ 35%
C. E. Jennings & Co. Nos. 181, 181.25
L. & I. J. White Co.2545%

Cold—

Cold Chisels, good quality. 13 @ 13¢
Cold Chisels, fair quality. 11 @ 12¢
Cold Chisels, ordinary.9 @ 10¢
Elmore Tool Mfg. Co.:
Cold Chisels5045%

Chucks—

Almond Drill Chucks35%
Almond Turret Six-Tool Chuck.40%
Beach Pat. each \$8.00.3545%
Blacksmiths'25%
Cincinnati Chuck Co.:
Independent 4-Jaw Reversible35%
Empire25%
Jacobs' Drill Chucks35%
Pratt's Positive Drive25%
Skinner Lathe Chucks:
Independent35%
Universal, Reversible Jaws35%
Universal, Com. Style Jaws40%
Combination, Reversible Jaws35%
Combination, Com. Style Jaws40%
Round Body or Box Body, 2 Chuck Jaws25%
Geared Scroll Chucks25%
Drill Chucks:
New Model. 25%; Geared Patent, 25%; Skinner Patent, 25%
Positive Drive40%
Planer Chucks20%
Standard45%
Drill Press Vises30%
Face Plate Jaws35%
Standard Chuck Co.:
Improved Drill Chuck45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 2135%
Scroll Combinations, Nos. 63 and 6430%
Geared Scroll, Nos. 34 and 3530%
Independent Iron, Nos. 15 and 318.35
Independent Steel, No. 6125%
Union Drill Nos. 000, 00, 100, 101, 102, 103, 10435%
Union Gear Drill25%
Universal, 1, 12, 16, 17, 13, 14, 1540%
Universal No. 4235%
Iron Face Plate Jaws, Nos. 25, 30, 48 and 5035%
Steel Face Plate Jaws, Nos. 70 and 7230%
Westcott Patent Chucks:
Lathe Chucks50%
Little Giant Auxiliary Drill50%
Little Giant Double Grip Drill50%
Little Giant Drill, Improved50%
Oneida Drill50%
Scroll Combination Lathe50%
Whitaker Mfg. Co.:
National Drill25%

Clamps—

Carriage Makers', Star, P. S. & W. Co.50%
Resly, Parallel35410%
Hammer & Co.:
Adjustable2045%
Carriage Makers' H. P. Screw4045%
Myers' Hay Rack50%
Lineman's Swedish Nevertum60%
Saw Clamps, see Vises, Saw Files

Cleaners, Drain—

Iwan's Champion, Adjustable50%
Iwan's Champion, Stationary40%

Sidewalk—

American Fork & Hoe Co.:
Star, 1/2 doz., Socket, \$4.00;
Shank\$3.50
Shank, 1/2 doz., X 7 1/2, \$3.50; Shank, X 8\$3.75

Cleavers, Butchers—

Foster Bros.30%
Fayette R. Plumb30%
L. & I. J. White Co.30%

Clippers, Horse and

Chicago Flexible Shaft Co.:
1802 Chicago Horse, each, \$10.75
20th Century Horse, each, \$5.00
Lightning Belt Horse, each, \$15.00
Chicago Belt Horse, each, \$20.00
Stewart's Enclosed Gear Ball Bearing Horse, each, \$7.50
Stewart's New Model Sheep Shearing Machine, each, \$12.75
Stewart's Enclosed Gear Shearing Machine, No. 8, each, \$9.75

Clips, Axle—

Regular Styles, List July 1, '05, 80410 @ 10%

Cloth and Netting, wire

—See Wire, &c.

Cocks, Brass—

Hardware List:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c.75%
Compression Bibbs70%

Coffee Mills—

See Mills, Coffee.

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's List40%
Leather, Walter B. Stevens & Son's List40%

Compasses, Dividers, &c.

Ordinary Goods75 @ 7545%

Conductor Pipe—

L. C. L. to Dealers:
Gal. Steel. Charcoal, Copper.

Northeastern: 70410 @ 5041047 1/2 50410%

Eastern: 75410 @ 5041047 1/2 50410%

Central: 75410 @ 60% 50410%

Northwestern: 75410 @ 60% 50410%

Tennessee: 70410 @ 50412 1/2 5045%

Southern: 70410 @ 50412 1/2 5045%

Southwestern: 70410 @ 5045% 5045%

Terms, 60 days: 2% cash 10 days. Factory shipments generally delivered.

See also Eave Troughs.

Coolers, Water—

L. & G. Mfg. Co.:
Galvanized, ea. \$1.85 \$2.00 \$2.25 \$2.50 \$3.00
Galvanized, Lined, side handles, Each\$1.35 \$2.15 \$2.40 \$3.30 \$4.15
White Enamelled\$1.50
Agate Lined30%

Coppers' Tools—

See Tools, Coppers'.

Coppers, Soldering—

Soldering Coppers, 3 lb. to pair and heavier, 2 1/4"; lighter than 3 lb. to pair23 1/2¢

Cord— Sash—

Braided, Drab1b, 35¢
Braided, White, Com. Nos. 8 to 12, 25¢; No. 7, 25¢; No. 6, 24¢. In lots of 12 doz. or over, 1 cent less per pound.

Cable Laid Italian, 1b, No. 18, 37¢
Italian, 1b, A, No. 18, 25¢; B, 22¢
Common India1b, 11¢ @ 11 1/2¢
Cotton Sash Cord, Twisted, 18 @ 20¢
Patent Russia1b, 21¢
Cable Laid Russia1b, 21¢
India Hemp, Twisted, 1b, 13¢ @ 14¢
India Hemp, Twisted, 1b, 17¢
Pearl Braided, cotton, No. 6, 1b, 19¢; No. 7, 19¢; No. 8, 19¢; No. 9, 19¢; No. 10, 19¢; No. 11, 19¢; No. 12, 19¢; No. 13, 19¢; No. 14, 19¢; No. 15, 19¢; No. 16, 19¢; No. 17, 19¢; No. 18, 19¢; No. 19, 19¢; No. 20, 19¢; No. 21, 19¢; No. 22, 19¢; No. 23, 19¢; No. 24, 19¢; No. 25, 19¢; No.

10-lb. cans, 10 in case, 6¢ 7¢ 8¢
 10-lb. cans, less than 10, 10¢ 10¢ 8¢
 Less quantity, 10 10 8
 NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extensions, Bit—
 Ford's Auger Bit Extensions, 40¢ 5¢
Extractors, emon Juice—
 —See Squeezers, Lemon.

Fasteners, Blind—

Zimmerman's Jap'd and Galv., 50¢ 5¢; Bronze and Plated, 50¢
 Walling's, 50¢
 Upson's Patent, 40¢

Cord and Weight—
 Ives, gro., \$1.08, 10¢
 Titan, gro., \$0.66, 10¢

Corrugated—
 Acme Corrugated Fasteners, 70¢

Faucets—

Cork Lined, 50¢ 10¢ 60¢
 Metallic Key, Leather Lined, 60¢ 10¢ 70¢
 Red Cedar, 40¢ 5¢ 10¢ 40¢ 5¢
 Petroleum, 70¢ 10¢ 70¢

B. & L. B. Co.:—
 Metal Key, 60¢ 10¢
 Star, 50¢ 10¢

West Lock, 50¢ 10¢
 John Sommer's Peerless Tin Key, 40¢
 John Sommer's Boss Tin Key, 50¢
 John Sommer's Victor Mtl. Key, 50¢ 10¢
 John Sommer's Duplex Metal Key, 60¢
 John Sommer's Diamond Lock, 40¢
 John Sommer's I.X.L. Cork Lined, 50¢
 John Sommer's Reliable Cork Lined, 50¢ 10¢

John Sommer's Chicago Cork Lined, 60¢
 John Sommer's O. K. Cork Lined, 50¢
 John Sommer's No Brand, Cedar, 50¢
 John Sommer's Perfection, Cedar, 40¢
 Self Measuring:
 Enterprise, Self Measuring and Pump, 30¢ 50¢
 Lane's, 30¢ 50¢
 National Measuring, 30¢ 50¢

Felloe Plates—
 See Plates, Felloe.

Files— Domestic—

List Nov. 1, 1899.
 Best Brands, 70¢ 10¢ 75¢ 10¢
 Standard Brands, 75¢ 10¢ 80¢ 10¢
 Lower Grade, 75¢ 10¢ 80¢ 10¢
 Diston's Superline, 60¢
 Gold Medal, 70¢
 McCaffrey's American, 60¢ 10¢ 10¢

Imported—
 Stubs' Tapers, Stubs' Hat, July 24, '97, 35¢ 10¢ 40¢

Fixtures, Fire Door—

Richards Mfg. Co.:
 Universal, No. 103; Special, No. 104
 Fusible Links, No. 96, 50¢
 Expansion Bolts, No. 107, 60¢ 10¢

Grindstone—

Net Prices:
 Inch, 15 17 19 21
 Per doz., \$3.60 3.85 4.15 4.65
 Peck, Stow & Wilcox Co.:
 In, 15 17 19 21 24
 \$4.00 4.40 4.75 5.50 6.50, 30¢
 Reading Hardware Co., 30¢

Fodder Squeezers—

See Compressors.

Forks—

American Fork & Hoe Co.:
 Iowa Dig-Ezy Potato, 70¢ 5¢
 Hay, Regular, 3-tine, 45¢ 20¢ 12¢
 Hay, Regular, 4-tine, 60¢ 7¢ 5¢
 Champion, Hay, 60¢ 12¢
 Acme, Hay, 60¢ 20¢
 Manure, Regular, 4-tine, 55¢ 5¢
 Manure, Regular, 5 and 6 tine, 70¢
 Champion, Manure, 60¢ 7¢ 5¢
 Columbia, Manure, 70¢
 Acme, 4-tine, 60¢ 10¢ 5¢
 Round Shoulder Header, 4-tine, 65¢
 Champion, Header, 65¢
 Dakota, Header, 65¢
 Kansas Header, 65¢
 Wood, Barley, 35¢
 Columbia, Spading, 70¢ 7¢ 5¢

Frames— Wood Saw—

White, 8' 9' Bar, per doz. 75¢ 90¢
 Red, 8' 9' Bar, per doz. \$1.00 1.25
 Red, Dbl. Brace, per doz. \$1.40 1.50

Freezers, Ice Cream—

Qt., 1 2 3 4 6
 Each, \$1.25 1.60 1.90 2.20 2.80

Fruit and Jelly Presses—

See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.

Fuse— Per 1000 Feet.

Hemp, \$2.75
 Cotton, 3.20
 Waterproof Spl. Taped, 3.65
 Waterproof Dbl. Taped, 4.40
 Waterproof Tpl. Taped, 5.15

Gates, Molasses and Oil—

Stebbins' Pattern, 80¢ 10¢ 45¢

Gauges—

Marking, Mortise, &c., 50¢ 50¢ 10¢
 Chapin-Stephens Co., 50¢ 50¢ 10¢
 Diston's Marking, Mortise, &c., 50¢ 10¢
 Wire, Brown & Sharpe's, 35¢ 4¢
 Wire, Morse's, 25¢
 Wire, P. S. & W. Co., 35¢

Gimlets— Single Cut—

Numbered assortments, per gro.

Nail, Metal, No. 1, \$2.00; 2, \$2.30
 Spike, Metal, No. 1, \$1.00; 2, \$1.30

Nail, Wood Handled, No. 1, \$2.30; 2, \$2.60
 Spike, Wood Handled, No. 1, \$1.30; 2, \$1.60

Glass, American Window

See Trade Report.

Glasses, Level—

Chapin-Stephens Co., 65¢ 65¢ 10¢
 Diston & Sons, 60¢ 10¢

Glue, Liquid Fish—

Bottles or Cans, with Brush, 25¢ 10¢ 50¢

Elwell's, 50¢

Grease, Axle—

Common Grade, gro. \$6.00 to \$6.50
 Dixon's Everlasting, 10-lb. pails, ea. \$8; in boxes, 3 doz., 1 lb., \$1.20;
 2 lb., \$2.00
 Helmet Hard Oil, 25¢

Gridles, Soapstone—

Pike Mfg. Co., 33¢ 33¢ 10¢

Grinders—

Pike Mfg. Co.:
 Hand and Foot Power, Pyko Nos. 1, 2, 3; Pyko Primo; Pyko Peerless; Pyko Spiral (foot power), 33¢ 1/2
 Mower Knife and Tool, \$5.00, 40¢ 10¢
 Royal Mfg. Co.:
 Hand and Foot Power, each, Nos. 01, \$1.75; 1A, \$2.50; 10, \$5.00
 Sickie Grinders, each, Nos. 20, \$3.00; 20A, \$6.00; 20A Combined, \$6.50
 Disc Grinders, each, \$2.50, 40¢

Grindstones—

Pike Mfg. Co.:
 Improved Family Grindstones, 30 inch, 30 doz., \$2.00, 33¢ 1/2
 Richards Mfg. Co., Eli and Cycle, Ball Bearing, mounted, 40¢

Grips, Nipple—

Perfect Nipple Grips, 40¢ 10¢ 2¢

Halters and Ties—

Cow Ties, 70¢ 10¢ 10¢
 Bridgeport Chain Co.:
 Triumph Coil and Halters, 35¢ 2¢ 40¢
 Brown Coil and Halters, 45¢ 50¢ 45¢
 Brown Cow Ties, 50¢ 50¢ 10¢ 45¢
 Brown Tie Outs, 70¢ 10¢ 75¢ 45¢

Covert Mfg. Co.:
 Web, 30¢ 2¢
 Jute Rope, 35¢
 Sisal Rope, 20¢
 Cotton Rope, 45¢
 Hemp Rope, 45¢

Oneida Community:
 Am. Coil and Halters, 40¢ 40¢ 5¢
 Am. Cow Ties, 45¢ 50¢
 Niagara Coil and Halters, 45¢ 50¢ 45¢
 Niagara Cow Ties, 45¢ 50¢ 10¢ 45¢

Hammers—

Handled Hammers—
 Heller's Machinists, 55¢ 10¢ 55¢ 10¢ 5¢
 Heller's Farmers, 40¢ 40¢ 10¢ 45¢
 Peck, Stow & Wilcox Co.:
 Crucible Steel, 40¢ 10¢ 50¢
 Farriers, 40¢ 10¢ 50¢
 Riveting, 40¢ 10¢ 50¢
 Machinists, 60¢ 50¢
 Blacksmiths, 50¢
 Elmore Shoemakers' Hammers, 75¢
 Kayate R. Plumb:
 A. E. Nail, 40¢ 2¢ 60¢ 12¢ 1/2
 Enns and B. S. Hand, 50¢ 10¢ 50¢ 60¢ 45¢
 Machinists' Hammers, 60¢ 10¢ 45¢
 Rivet and Tinner's, 40¢ 7¢ 60¢ 12¢ 1/2 45¢
 Victor Magnetic Tack, 37¢

Heavy Hammers and Sledges—

Under 3 lb., per lb., 50¢, 80¢ 10¢
 3 to 5 lb., per lb., 40¢, 80¢ 10¢ 40¢
 Over 5 lb., per lb., 30¢, 80¢ 10¢ 40¢
 Over 5 lb., per lb., 30¢, 80¢ 10¢ 40¢

Handles—

Agricultural Tool Handles
 Axe, Pick, &c., 60¢ 10¢ 60¢ 10¢ 45¢
 Hoe, Rake, &c., 40¢
 Fork, Shovel, Spade, &c., 40¢
 Long Handles, 40¢
 D Handles, 40¢

Cross-Cut Saw Handles—

Atkins', 40¢
 Diston's Handles and Saw Tabs, 45¢

Mechanics' Tool Handles—

Auger, assorted, gro. \$3.00 to \$3.50
 Brad Axl., 30¢ 10¢ 1.15
 Chisel Handles, Ass'd, per gro., 25¢
 Tanged Firmer, Apple, 32¢ 10¢
 25¢; Hickory, 32¢ 10¢ 1.10
 Socket Firming, Apple, 1.75¢
 1.95; Hickory, 1.60 to 1.75
 Socket Framing, Hickory, 1.60 to 1.75

File, assorted, gro. \$1.30 to \$1.40
 Hammer, Hatchet &c., 60¢ 10¢ 60¢ 10¢ 45¢
 Hand Saw, Varnished, doz., 80¢
 85¢; Not Varnished, 65¢ 75¢
 Plane Handles:
 Jack, doz., 30¢; Fore, doz., 45¢
 Chapin-Stephens Co.:
 Carving Tool, 30¢ 30¢ 10¢
 Chisel, 60¢ 60¢ 10¢
 File and Awl, 60¢ 60¢ 10¢
 Saw and Plane, 30¢ 30¢ 10¢
 Screw Driver, 30¢ 30¢ 10¢
 Millers Falls Adj. and Hatchet Auger, 15¢ 10¢
 Nicholson Simplicity File Handle, 30¢
 J. L. Osgood:
 Indestructible File and Tool, 30¢
 No. 1, \$3.00; No. 2, \$3.50;
 No. 3, \$3.00; No. 4, \$3.50;
 No. 5, \$10.00, gro. lots 10¢

W. A. Zelnicker Supply Co.:—

Hammer, 30 doz., 12 in., \$2.00;
 14 in., \$2.00; 16 in., \$2.30; 18 in., \$2.50; 20 in., \$2.70; 22 in., \$3.00; 24 in., \$3.30; 26 in., \$3.50;
 30 in., \$3.80; oval, 30 in., \$3.80; octagon, 30 in., \$3.80; oval, 36 in., \$4.00; octagon, 36 in., \$4.00;
 Axe, 30 doz., 28 to 34 in., \$5.60;
 36 in., \$5.80;
 Adze, 30 doz., 36 in., \$5.80; 36 in., \$7.80;
 Pick, 30 doz., R. R., 36 in., \$8.00; coal, 34 in., \$5.80;
 Hatchet, 30 doz., 12 to 14 in., \$2.00.

Hangers—

NOTE.—Barn Door Hangers are generally quoted per pair, without track and Parlor Door Hangers per double set with track.

Chicago Spring Butt Co.:
 Friction, 25¢
 Oscillating, 25¢
 Big Twin, 25¢
 Chisholm & Moore Mfg. Co.:
 Baggage Car Door, 50¢
 Trolley Hangers, 30¢
 Railroad, 50¢
 Cronk & Carrier Mfg. Co.:
 Loose Axle, 60¢ 10¢
 Roller Bearing, 70¢
 Griffin Mfg. Co.:
 Solid Axle, No. 10, \$12.00, 60¢ 10¢
 Roller Bearing, No. 11, \$15.00, 60¢ 10¢
 Roller Bearing, Ex. Hy., No. 22, \$18.00, 60¢ 10¢
 Bull Dog, \$24.00, 70¢
 Lane Bros. Co.:
 Parlor, Ball Bearing, \$4.00;
 Standard, \$3.15; No. 105, \$2.35;
 New Model, \$2.30; New Champion per set of 4 Hangers, complete with track, \$2.25
 Barn Door, Standard, 60¢ 10¢
 Hinged, 60¢ 10¢
 Covered, 60¢ 10¢
 Special, 70¢ 45¢
 Trolley Hangers and track, 50¢
 Lawrence Bros.:
 Cleveland, 70¢ 7½¢
 Clipper, No. 75, 60¢
 Crown, 65¢ 10¢
 Cyclone, No. 40, net \$6.50
 Tandem, No. 50, net \$7.50
 New York, 55¢ 10¢
 Trolley, No. 38, pair, \$1.25
 McKinney Mfg. Co.:
 Roller Bearing, Nos. 1 and 2, 70¢
 Anti-Friction, 60¢
 Hinged Hangers, King Charm, 60¢
 Richards Mfg. Co.:
 Hangers, Nos. 47, 48, 147, 247, 60¢ 45¢
 Pioneer Wood Track, No. 3, \$2.25
 Roller B'g St'l Track No. 12, \$2.20
 Roller B'g St'l Track No. 13, \$2.50
 Roller B'g, Nos. 39, 41, 43, 70¢ 7½¢
 Hero, Adj. Track No. 19, 50¢ 10¢
 Adjustable Track Tandem Trol., 50¢ 10¢
 Jey Track, No. 16, 50¢ 10¢
 Seal, Steel Track No. 8, 42¢
 Auto Adj. Track No. 22, 50¢ 45¢
 Trolley B. D. No. 17, \$1.25; F. D. No. 120, \$2.25; No. 121, \$2.45; No. 150, \$2.50
 Safety Underwriters F. D. No. 107, 50¢
 Tandem No. 41, 25¢ and 3 60¢ 45¢
 Palace, Adjustable Track No. 132, 50¢ 45¢
 Royal, Adjustable Track No. 122, 50¢ 45¢
 Ives Wood Track No. 1, 42¢
 Trolley B. D. No. 20, 50¢ 10¢
 Trolley B. D. No. 24, \$1.30; No. 27, \$1.40; No. 28, \$1.50, \$1.60
 Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2, 70¢ 45¢
 Anti-Friction, No. 42; No. 44, sizes 2½ and 3, 60¢
 Hinged Tandem, No. 43, 60¢ 45¢
 Folding Door B. B. Swivel No. 135, 40¢
 Taylor & Boggs F'y Co.'s Kidder's Roller Bearing, 30 doz., 4 in., \$12.00; 5 in., \$14.00, 40¢ 10¢
 Myers' Stayon Hangers, 60¢

Hangers—Garment—

Pullman Trouser, Garment, No. 1 \$3.00; No. 4, \$24.00; No. 5, \$16.50; No. 8, Black Enamel, \$7.50; No. 10, \$21.00; No. 12, \$8.00; No. 15, Rods, \$2.00; No. 18, Loops, \$10.00
 Victor Folding, 30¢ 30¢

Gate—

Myers' Patent Gate Hangers, 30 doz., net, 50¢

Joist and Timber—

Lane Bros. Co., 35¢

Hooks—

Griffin's Security Hook, 50¢ 10¢
 McKinney's Perfect Hook, 30 doz., 60¢

Hatchets—

Regular list, first qual. 50¢ 10¢ 60¢
 Second quality, 60¢ 60¢ 10¢

Heaters, Carriage—

Clark, No. 5, \$1.25; No. 5B, \$1.50; No. 3, \$1.75; No. 3D, \$2.00; No. 7D, \$2.25; No. 3E, \$2.50; No. 1, \$3.00, 25¢
 Clark Coal, 30 doz., \$0.75, 20¢

Hinges—

Blind and Shutter Hinges
 Surface Gravity Locking Blind:
 Doz. Sets with Fastenings, No. 1, \$0.70; No. 3, \$1.25; No. 5, \$2.65.
 Mortise Shutter, 80¢
 Mortise Reversible Shutter, 80¢
 North's Automatic Blind Fixtures, No. 2, for Wood, \$3.00; No. 3, for Brick, \$1.50, 10¢
 Charles Parker Co., 70¢ 75¢
 Parker Wire Goods Co., 70¢
 Hale & Benjamin Automatic Blind Hinges, 20¢
 Hale's Blind Awning Hinges, No. 110, for wood, \$2.00; No. 111, for brick, \$2.00, 20¢

Reading's Gravity—

Stanley's Steel Gravity Blind Hinges, No. 1647½, 30 doz. sets, without screws, \$0.35; with screws, \$1.25.
 Wrightsville Hardware Co.:
 O. S. Lull & Porter, 75¢ 45¢
 Acme, Lull & Porter, 75¢
 Queen City Reversible, 75¢
 Shepard's Noiseless, Nos. 60, 65, 55, 75¢ 45¢
 Niagara, Gravity Locking, Nos. 1, 3 & 5, 75¢ 45¢
 Clark's O. P. No. 1, 75¢ 10¢
 Clark's O. P. Nos. 3 and 5, 75¢ 45¢
 Tip Pat'n, No. 1, 75¢ 10¢
 Clark's No. 3, 75¢ 45¢
 Buffalo Gravity Locking, Nos. 1, 3 & 5, 70¢ 10¢ 45¢
 Shepard's Double Locking, 75¢ 45¢
 Champion Gravity Locking, 75¢ 45¢
 Picner, 75¢ 10¢
 Empire, 65¢
 W. H. Co.'s Mortise Gravity Locking, Nos. 1, 2, 60¢ 10¢

Gate Hinges—

Clark's or Shepard's—Doz. sets:
 No. 1, 2 3
 Hinges with L'tchs, \$2.00 2.70 5.00
 Hinges only, 1.25 1.90 3.50
 Latches only, 70 75 35

New England:

With Latch, doz., \$2.00
 Without Latch, doz., \$1.60

Reversible Self-Closing:

With Latch, doz., \$1.75
 Without Latch, doz., \$1.35

Western:

With Latch, doz., \$1.75
 Without Latch, doz., \$1.15

Wrightsville Hardware Co.:
 Shepard's or Clark's Hinges and Latches, Hinges only or Latches only, Nos. 1, 2 or 3, 70¢

Miscellaneous—

Griffin Mfg. Co., Fleur de Lis Surface Hinges, 30 doz., \$1.00

Pivot Hinges—

Bommer Bros. Pivot, Ball Bearing, 40¢
 Lawson Mfg. Co. Matchless, 30¢

Spring Hinges—

Holdback, Cast Iron, \$6.75 to \$7.00
 Non-Holdback, Cast Iron, \$6.50 to \$6.75

J. Bardeley:
 Bardeley's Non-Checking Mortise Floor Hinges, 40¢
 Bardeley's Patent Checking, 35¢ 1/2

Bommer Bros.:
 Spring Butt Hinges, 40¢
 Surface Floor, Ball Bearing, 40¢
 Lavatory, Ball Bearing, 40¢
 Non-Holdback Screen Door, 40¢
 Nos. 200 and 900, 40¢
 Holdback Screen Door, No. 999, 30¢ 50¢, \$9.00

Chicago Spring Butt Co.:
 Chicago Spring Hinges, 25¢
 Triple End Spring Hinges, 30¢
 Chicago (Ball Bearing) Floor, 50¢
 Garden City Engine House, 25¢
 Keene's Saloon Door, 25¢
 Columbian Hardware Co.:
 Acme, Wrought Steel, 30¢
 Acme, Brass, 25¢
 American, 25¢
 Columbia, 30¢
 No. 13, 35¢
 Columbia, Adj. No. 7, gr. \$12.00
 Gem, new list, 30¢
 Clover Leaf and Acorn, per 60¢, \$12.00
 Oxford, new list, 30¢
 Floor Spring Hinges, 30¢ 10¢
 Columbian Steel, 65¢ 10¢

Lawson Mfg. Co.:
 Matchless Spring Hinges, 30¢
 Matchless Jamb Hinges, 30¢
 Richards Mfg. Co.:
 Superior Double Acting Floor Hinges, 40¢
 Shelby Spring Hinge Co.:
 Buckeye All Steel Holdback Screen Door, gr. \$9.00
 Chief Ball Bearings Floor Hinge, 50¢
 Ball Bearing Door, 25¢
 No. 177, Sheet Steel Holdback, gr. pr., \$3.00

Standard Mfg. Co.:
 Champion Double Acting Door Hinge, 25¢ 10¢ 10¢
 Standard Double Acting Floor Hinge, 25¢ 10¢ 10¢
 Superior Spring Hinges Co.:
 Superior Floor Hinges, 40¢
 Spring Hinges, 40¢

Wrought Iron Hinges—

Strap and T Hinges, &c., list February 10, 1908:

Light Strap Hinges, 65¢
 Heavy Strap Hinges, 75¢
 Light T Hinges, 60¢
 Heavy T Hinges, 40¢ 10¢
 Extra Hvy. T Hinges, 65¢ 10¢
 Hinge Haps, 40¢
 Cor. Heavy Strap, 75¢
 Cor. Ez. Heavy T, 65¢ 10¢

Screw Hook, 6 to 12 in., 1b. 3¢
 and Strap, 11 to 20 in., 1b. 3¢
 22 to 36 in., 1b. 3¢

Screw Hook and Eye:
 3 to 1 inch, 1b. 4¢
 3/4 inch, 1b. 7¢
 1/2 inch, 1

Hoes— Eye—
Scovill and Oval Pattern,
 60¢100@60¢10¢10%
Grub, list Feb. 23, 1899,
 70¢100@70¢10¢10%
D. & H. Scovill,.....27%
 Am. Fork & Hoe Co. (Scovill Pat-
 tern).....60¢5%

Handled—
 Cronk's Weeding, No. 1, \$2.00; No. 2, \$2.50
 Star Double Bit.....\$2.50
 American Fork & Hoe Co.:
 Regular, Cotton.....75¢10¢5¢2%
 Crescent, Cultivator.....75¢2%
 Mattock, Senior.....70%
 Mattock, Junior.....50%
 Sprouting.....50%
 Tobacco, Harper's.....60%15¢10%
 Warren.....65¢15¢10%
 Ivanhoe.....70¢10¢10%
 Cultivator, B B 6.....70¢10¢10%
 Cultivator, B B 6.....70¢10¢10%
 Weeding, Acme.....72¢10¢10%
 Scuffle, Lightning.....60¢5%

Hoisting Apparatus—
 See Machines, Hoisting.

Holders— Bit—
 Angular, 3/4 doz., \$21.00.....45¢10%

Door—
 Bardley's, Iron, 40%; Brass and
 Bronze.....25%
 Empire.....50%
 Pullman.....25%
 Richards Mfg. Co.: No. 117, Ever-
 ready, 40%; No. 118, 119, Sure
 Grip.....40%
 Superior.....40%

File and Tool—
 Nicholson File Holders and File
 Handles.....33%40%

Fruit Jar—
 Triumph Fruit Jar Holder, 3/4 gross,
 \$18.00; 3/4 doz.....\$2.00

Trace and Rein—
 Fernald Double Trace Holder, 3/4 doz,
 pairs.....\$1.25
 Dash Rein Holder, 3/4 doz.....\$1.25

Hones—Razor—
 Pike Mfg. Co., Belgian and Swat,
 50%; German.....33%

Hooks—Cast Iron—
 Bird Cage, Reading.....40%
 Clothes Line, Reading.....40%
 Coat and Hat, Reading.....45¢20%
 Coat and Hat, Wrightsville.....60¢5%
 Harness, Reading List.....40%

Wire—
 Belt, Nos. 1 to 15.....75¢10¢80%
 Wire C. & H. Hooks.....80¢80¢10%
 Bradley Metal Clamp Wire, Coat and
 Hat.....75¢10¢80%
 Columbian Bldg. Co., Gem.....75¢10%
 Parker Wire Goods Co., King.....75¢10%
 Wire Goods Co.:
 Acme, 60¢10%; Chief, 70¢10%;
 Crown, 75%; Czar, 65¢10%; V
 Brace, 75%; Czar Harness, 50%;
 Ceiling, 75%.

Wrought Iron—
 Box, 6 in., per doz., \$0.90; 8 in.,
 \$1.15.
 Cotton.....doz. \$1.25@1.50
 Wrought Staples, Hooks, &c.,
 See Wrought Goods.

Miscellaneous—
 Hooks, Bench, see Steps, Bench.
 Bush, Light, doz., \$5.20; Medium,
 \$6.75; Heavy, \$7.50
 Grass, best, all sizes, per doz.,
 \$2.75@3.00
 Grass, common grades, all sizes,
 per doz.....\$1.25@1.50
 Whiffletree.....lb. 3%4¢
 Hooks and Eyes.....60¢60¢10%
 Brass.....70¢70¢10%
 Covert Mfg. Co. Gate and Scuttle
 Hooks.....40%
 Turner & Stanton Co. Cup and
 Shoulder.....55¢10%
 Bench Hooks—See Bench Steps.
 Corn Hooks—See Knives, Corn.

Horse Nails—
 See Nails, Horse.

Horseshoes—
 See Shoes, Horses.

Hose, Rubber—
 Garden Hose, 3/4-inch:
 Competition.....ft. 6¢6¢4¢
 3-ply Guaranteed.....ft. 8¢@9¢
 4-ply Guaranteed.....ft. 9¢@12¢
 Cotton Garden, 3/4-in., coupled:
 Low Grade.....ft. 8¢@9¢
 Fair Quality.....ft. 10¢@11¢

Irons— Sad—
 From 4 to 10.....lb. 2%4¢2%4¢
 B. B. Sad Irons.....lb. 3%4¢3%4¢
 Mrs. Potts', cents per set:
 Nos. 59 55 60 65
 Jap'd Caps.....85 93 95 93
 Tin'd Caps.....91 83 1.01 98
 New England Pressing.....lb. 3%4¢@4¢

Bar and Corner—
 Richards Mfg. Co., Bar, 60¢10%;
 Corner.....60%

Pinking—
 Pinking Irons.....doz. 60¢@65¢

Irons, Soldering—
 See Coppers.

Jacks, Wagons—
 Covert Mfg. Co.:
 Auto Screw.....20¢2%; Steel, 45%
 Lockport.....50%
 Lane's Steel.....30¢5%
 Richards' Tiger Steel, No. 130.....50¢10%
 Smith & Hemenway Co.'s.....25%

Ladder—
 Richards Mfg. Co., Ladder Jacks.....50%

Jointers—
 Pike Mfg. Co., Saw Jointers, \$7.00..40%

Kettles—
 Brass, Spun, Plain.....20¢25%
 Enamelled and Cast Iron—See Ware,
 Hollow.

Knives—
 Butcher, Kitchen, &c.—
 Foster Bros' Butcher, &c.....30%
 Wilkinson Shear & Cutlery Co.....60%

Corn—
 Columbian Cutlery Co., Wilcut
 Brand Knives and Hooks.....60%
 American Fork & Hoe Co.:
 Easy Cut, 3/4 doz., No. 10 C H.....\$2.10
 Easy Cut, 3/4 doz., No. 10 B C H.....\$2.20
 Acme, 3/4 doz.....\$2.35
 Dent, 3/4 doz.....\$2.35
 Adjustable, Serrated, 3/4 doz.....\$1.90
 Serrated, 3/4 doz.....\$1.85
 Yankee, No. 1 C H.....\$1.35
 Yankee, No. 2 C H.....\$1.15

Drawing—
 Standard List.....80¢10¢—%
 C. E. Jennings & Co., Nos. 45, 46,
 47.....41%42%
 Jennings & Griffin, Nos. 41, 42,
 43.....66%67%
 Swan's.....66%67%
 Watrous.....16%
 L. & I. J. White.....20¢5¢25%

Hay and Straw—
 Serrated Edge, per doz. \$5.00@5.50
 Iwan's Sickle Edge.....3/4 doz. \$0.50
 Iwan's Serrated.....3/4 doz. \$1.00

Miscellaneous—
 Farriers'.....doz. \$2.60@3.55
 Wostenholm's.....3/4 doz. \$3.00@3.25

Knobs—
 Base, 2 1/2-inch, Birch or Maple,
 Rubber Tip.....gro. \$1.25@1.40
 Carriage, Jap., Drive, all sizes,
 gro. \$2.50@4¢
 Door, Mineral.....doz. 85¢@1.00
 Door, Por. Jap'd.....doz. 70¢@75¢
 Door, Por. Nickel.....doz. \$2.05@2.15
 Hardsley's Wood Door, Shutters, &c., 18%

Lacing, Leather—
 See Belting, Leather

Ladders, Store, &c.—
 Lane's Store.....25%
 Myers' Noiseless Store Ladders.....50%
 Richards Mfg. Co.:
 Improved Noiseless, No. 112.....50%
 Climax Shelf, No. 113.....50%
 Trolley, No. 109.....50%

Ladies, Melting—
 L. & G. Mfg. Co., Melting and
 Plumbers'.....25%
 P. S. & W.....40¢10%
 Reading.....60%

Lamps—
 Hammer's M. I. Hand.....45%

Lanterns—Tubular—
 Regular, No. 0.....doz. \$3.00@4.50
 Side Lift, No. 0.....doz. \$3.25@4.75
 Hinge Globe, No. 0.....doz. \$3.25@4.75
 Other Styles.....40¢5%

Bull's Eye Police—
 3-inch.....\$3.75@4.00

Latches—Thumb—
 Roggin's Latches, Jap'd, with
 Screws.....doz. 35¢@40¢

Door—
 Cronk & Carrier Mfg. Co., No. 101,
 Richards' Bull Dog, Heavy, 3/4 doz., \$2.00
 Richards' Trump, No. 127.....\$1.50

Leaders, Cattle—
 Small.....doz. 50¢; large, 60¢
 Covert Mfg. Co.:
 Cotton, 55%; Hemp, 45%; Jute,
 35%; Sisal, 20%.

Leathers, Pump—
 See Pumps.

Lifters, Transom—
 R. & E. Hardware Co.....10%

Lines—
 Wire Clothes, Nos. 13 19 20
 100 feet.....\$2.30 1.95 1.75
 75 feet.....\$1.95 1.65 1.50
 Samson Cordage Works:
 Solid Braided Chalk, Nos. 0 to 3, 40%
 Solid Braided Mosaic, No. 0.....30%
 Silver Lake Braided Chalk, No. 0,
 \$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3,
 \$7.50.....\$7.50
 Masous' Lines, Shade Cord, &c.:
 White Cotton, No. 3/4, \$1.50; No. 4,
 \$2.00; No. 4 1/2, \$2.50; Colors, No. 3/4,
 \$1.75; No. 4, \$2.25; No. 4 1/2, \$2.75;
 Linen, No. 3/4, \$2.50; No. 4, \$3.50;
 No. 4 1/2, \$4.50.....20%
 Tent and Awning Lines: No. 5,
 White Cotton, \$7.50; Drab Cotton,
 \$8.50.....20%
 Clothes Lines, White Cotton: 50 ft.,
 \$2.75; 60 ft., \$3.25; 70 ft., \$3.75;
 80 ft., \$4.00; 90 ft., \$4.25; 100 ft., \$4.75;
 100 ft., \$5.25.....20%
 Turner & Stanton Co.:
 Solid Braided Chalk, Mosaic and
 Awning Lines.....40%
 Clothes Lines, White Cotton.....20%
 Shade Cord, Cotton or Linen.....20%

Locks— Cabinet—
 Cabinet Locks.....33%1¢@33%1¢@5%

Door Locks, Latches, &c.—
 NOTE—Net Prices are very often made
 on these goods.

Reading Hardware Co.....40%
 R. & E. Mfg. Co.....10%

Padlocks—
 R. & E. Mfg. Co., Wrought Steel and
 Brass.....75¢10%

Sash, &c.—
 Ives' Patent:
 Crescent.....10%
 Automatic Gravity Metal Sash, 3/4
 gro., \$19.58.....10%
 Window Ventilating.....20%
 Pullman Patent Ventilating Lock.....25%
 Reading Sash Locks.....40%
 Taylor Mfg. Co., Perfect Ventilating,
 3/4 doz.....\$0.75@1.00

Machines—Boring—
 Com. Up'r't, without Augers,
 \$2.00@2.25
 Com. Ang'l'r, without Augers,
 \$2.25@2.50

Ford Auger Bit Co.....\$2.00
 Jennings, Nos. 1 and 4.....25¢7%
 Millers' Falls.....5.75
 Snell's, Upright, \$2.65; Angular, \$2.90
 Swan's Improved.....40¢10%

Corking—
 Reisinger Invincible Hand Power.....
 3/4 doz. \$48.00

Fence—
 Williams' Fence Machines.....each, \$5.50

Hoisting—
 Moore's Anti-Friction Chain Hoist, 30%
 Brake.....20%
 Moore's Cyclone High Speed Chain
 Hoist.....25%

Ice Cutting—
 Chandler's.....12%4%

Washing
 Boss Washing Machine Co.: Per doz.
 Boss No. 1.....\$57.00
 Boss Rotary.....\$57.00
 Champion Rotary Banner No. 1, \$57.00
 Standard Champion No. 1.....\$50.00
 Standard Perfection.....\$27.00
 Cincinnati Square Western.....\$35.00
 Uneda American, Round.....\$35.50

Mallets—
 Hickory.....45¢50¢
 Lignumvite.....45¢50¢
 Tinnert's Hickory and Apple-
 wood.....doz. 45¢50¢

Mangers, Stable—
 Sweet Iron Works.....50%

Mats, Door—
 Acme Flexible Steel.....60%
 Elastic Steel (W. G. Co.), new list, 50%
 Everlasting Flexible Steel.....33%4%

Mattocks—
 See Picks and Mattocks.

Milk Cans—See Cans, Milk.

Mills, Coffee, &c.—
 Enterprise Mfg. Co.:
 Coffee.....20¢25%
 Shell and Corn.....25¢30%
 National list, Jan. 1, 1902.....30%
 Parker's Columbia and Victoria.....33%4%
 Parker's Box and Side.....50¢10%
 Swift, Lane Bros. Co.....30%

Motors, Water—
 Divine's Red Devil.....30%
 \$2.50 3.50 10.00 15.00.....33%4%
 No. 1 2 3 4
 Lippincott's:
 No.....1 2 3 4
 \$2.50 3.50 10.00 15.00.....33%4%

**Pike Mfg. Co., Tool and Knif-
 Grinding.....33%4%**

Mowers, Lawn—
 NOTE—Net prices are generally quoted
 Cheapest, 10-in., \$2.00; advance
 10¢ for each size.
 Cheap, 10-in., \$2.25; advance 15¢
 20¢ for each size.
 Better Grade, 10-in., \$3.00; ad-
 vance 25¢ for each size.

High Grade.....\$1.50 4.75 5.00 6.25
 Continental.....60%
 Great American.....70%
 Great American Ball B'rg, new list, 70%
 Quaker City.....70%
 Pennsylvania.....60%
 Pennsylvania, Jr., Ball Bearing,
 50¢10¢5%
 Pennsylvania Golf.....50%
 Pennsylvania Horse.....33%4%5%
 Pennsylvania Pony.....40¢5%

Nails—
 Wire Nails and Brads, Miscel-
 laneous.....85¢5¢@85¢10%
 Cut and Wire. See Trade Report.

**Hungarian, Finishing, Upholster-
 ers', &c. See Tacks.**

Horse—
 Nos. 6 7 8 9 10
 Anchor.....23 21 20 19 18.....lb. 12¢
 Coleman.....13 12 11 11 11 net lb 12¢
 New Haven.....23 21 20 19 18.....lb. 12¢
 Livingston.....19 18 17 16 16 net lb 12¢
 Western.....lb 8 4¢
 Jobbers' Special Brands,
 per lb. 9¢

Picture—
 1 1/4 2 2 1/4 3 in.
 Brass Hd. gro. 45 53 60 70
 Por. Head, gro. 1.10 1.10 1.10

Upholsters—
 Brass.....30%
 Plated.....30¢10%

Nippers—
 See Pliers and Nippers.

Nipples—
 Standard Nipple Co.:
 Wrought Pipe Nipples.....80%

Nuts— Blank or Tapped.
 Cold Punched: Off list.
 Square.....5.00¢
 Hexagon.....6.00¢
 Square, C. T. & R.....5.80¢
 Hexagon, C. T. & R.....6.00¢

Hot Pressed: Off list.
 Square.....5.90¢
 Hexagon.....6.40¢

Oakum—
 Best.....lb. 6%4¢
 U. S. Navy.....lb. 6 ¢
 Navy.....lb. 5 ¢
 Plumbers' Spun Oakum.....2%4¢

Oil—
 Pike Mfg. Co., Stonoil.....40%

Oil Tanks—See Tanks, Oil.

Oilers—
 Steel, Copper Plated.....75¢10%
 Chase or Paragon:
 Brass and Copper.....50¢10%
 Zinc.....65¢10¢70%
 Railroad.....60¢10¢10%
 American Tube & Stamping Co.:
 Spring Bottom Cans.....70¢70¢10%
 Railroad Oilers, &c.....60¢60¢10%
 Hero Fruit Jar Co.:
 Spring Bottom Cans.....70¢70¢10%
 Railroad Oilers, &c.....60¢60¢10%
 Malleable, Hammers' Improved, Nos.
 11, 12 and 13, 10%; Old Pattern,
 Nos. 1, 2, 3, 4, 50%;
 Maple City Mfg. Co.:
 Spring Bottom Cans.....70¢70¢10%
 Railroad Oilers, &c.....60¢60¢10%

Openers—Packing Box—
 Herculever, 3/4 doz., \$24.....30%

Can Openers—
 Per doz.
 Sprague, Iron Handle.....30¢45¢
 Sprague, Wood Handle.....40¢
 Sardine Scissors.....\$1.75@3.00
 Can and Bottle Openers, 3/4 doz.,
 net: Yankee \$0.75@0.85; Little
 Gem, \$0.50@0.65; Nifty.....\$0.75

Egg—
 Hartigan Nickel Plate, 3/4 doz., \$2.00;
 Silver Plate, \$4.00.

Packing—
 Asbestos Packing, Wick and
 Rope, any quantity.....16¢17¢

Rubber—
 (Fair quality goods.)
 Sheet, C. I.....11¢12¢
 Sheet, C. O. S.....11¢12¢
 Sheet, C. B. S.....12¢13¢
 Sheet, Pure Gum.....40¢45¢
 Sheet, Red.....40¢50¢
 Jenkins' '96, 3/4 lb, 80¢.....25%

Miscellaneous—
 American Packing.....lb. 7¢10 ¢
 Cotton Packing.....lb. 16¢25 ¢
 Italian Packing.....lb. 9¢10 ¢
 Jute.....lb. 4¢4 1/2 ¢
 Russia Packing.....lb. 9¢10 ¢

Pails, Water, Well, &c.—
 See Buckets.

Paint—
 Dixon's Silica-Graphite, in 1 gal.
 pails and 5 gal. kegs, 25% pack-
 ages of larger size.....20%

Pans— Dripping—
 Standard List.....75¢5¢@75¢10%
 Edwards, Royal Blue.....75%

Fry—
 Common Lipped:
 Nos.....1 2 3 4 5
 Per doz.....\$0.75 0.85 0.95 1.15 1.30

Refrigerator, Galva.—
 Inch.....12 14 16 18
 Per doz.....\$1.75 2.25 2.80 3.15

Paper—Building Paper
 Asbestos:
 Roll Board or Building Felt,
 6 to 30 lb., per 100 sq. ft., 2%4¢
 Roll Board or Building Felt,
 3-32 and 1/4 in., 45 to 60 lb.,
 per 100 sq. ft.....3%4¢
 Mill Board, Sheet, 40 x 40 in.,
 1-32 to 1/4 in.....3%4¢
 Per roll.
 Rosin Sized Sheathing: 500 sq. ft.
 Light weight, 25 lbs. to roll,
 48¢53¢
 Medium weight, 30 lbs. to roll,
 56¢70¢
 Heavy weight, 40 lbs. to roll,
 75¢78¢

**Black Water Proof Sheathing,
 500 sq. ft., 1 ply, 65¢; 2 p'y,
 85¢; 3 ply, \$1.10; 4 ply, \$1.25.**

**Deafening Felt, 9, 6 and 4 1/2 sq.
 ft. to lb., tons.....\$5.50**

**Red Rope Roofing, 250 sq. ft.
 per roll.....\$1.75**

Tarred Paper—
 1 ply (roll 400 sq. ft.), ton.
 \$31.00@39.00
 2 ply, roll 108 sq. ft.....65¢
 3 ply, roll 108 sq. ft.....88¢
 Slater's Felt (roll 500 sq. ft.).....80¢

Sand Paper and Cloth—
 Flint and Emery.....50¢10%
 Garnet Paper and Cloth.....25%

Parers—Apple—
 Goodell Co.:
 Family Bay State.....3/4 doz. \$15.00
 Improved Bay State.....3/4 doz. \$36.00
 New Lightning.....3/4 doz. \$7.00
 T-r Table '98.....3/4 doz. \$4.00
 White Mountain.....3/4 doz. \$5.00
 Romanza Improved.....each \$7.50
 Dandy.....each \$10.00
 Eureka Improved.....each \$20.00
 New Century.....each \$20.00
 Ranger.....each \$30.00

Livingston Nail Co.:	
Daisy	doz. \$4.00
Little Star	doz. \$5.00
Rocking Table	doz. \$6.20
Reading Hardware Co.:	
Advance	doz. \$4.00
Baldwin	doz. \$4.00
Reading 72	doz. \$3.25
Reading 78	doz. \$6.25

Orange—

Goodell Co., Success	each \$20.00
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Potato—

Saratoga	doz. \$7.30
White Mountain	doz. \$6.00

Picks and Mattocks—

(List Jan., 1908.)

List	75¢10%
Cronk's Handled Garden Mattock	
doz., \$3.00	33%

Pinking Irons—

See Irons, Pinking.

Pins, Escutcheon—

Brass	50¢50¢10%
Iron, list Nov. 11, '85	60¢60¢10%

Pipe, Cast Iron Soil—

Eastern Prices:	
Standard, 2-6 in.	68%
Extra Heavy, 2-6 in.	74%
Fittings, Standard and Heavy	80%1%

Pipe, Merchant—

Carloads to Consumers:

Steel.

Blk. Galv. Blk. Galv.

1/2 and 1/4 in.	%	%
1/2 in.	%	%
3/4 in.	%	%
1 in.	%	%
1 1/4 in.	%	%
1 1/2 in.	%	%

Pipe, Vitrified Sewer—

Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:	87%
First-class	87%
Second-class	90%

Pipe, Stove—

Edwards' Nested:	Per 100 joints.
5 in., Standard Blue	\$6.25
6 in., Standard Blue	6.75
7 in., Standard Blue	7.75
8 in., Standard Blue	8.00
9 in., Standard Blue	8.50
10 in., Standard Blue	8.50
11 in., Standard Blue	8.50
12 in., Standard Blue	8.50

Planes and Plane Irons—

Bench, first qual.	30¢30¢5%
Bench, second qual.	25¢25¢5%
Molding	25¢25¢5%
Chapin-Stephens Co.	
Bench, First Quality	30%
Bench, Second Quality	40%
Molding and Miscellaneous	25%
Toy and German	30%
Union	60%

Plane Irons—

Wood Bench Plane Irons, list Dec. 12, '06	25%
Buck Bros.	30%
Chapin-Stephens Co.	25%
L. & J. White	25%25%

Planters, Corn, Hand—

Kohler's Eclipse	doz. \$7.50
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Plates—

Fellows	lb. 3%4¢
Avery Stamping Co.:	
Standard Wrot. Steel Fellows Plates in 100 lb kegs, per 100 lb, 1/4-in. to 1 1/4-in., \$1.00 net; 1 1/4-in. to 2-in., inclusive, \$3.75 net.	

Steel Pipe Hook—

Never-Break	75¢10%
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Pliers and Nippers—

5 in.,	Uniform	Color..	\$5.90	\$6.90
6 in.,	Uniform	Color..	6.40	7.40
7 in.,	Uniform	Color..	7.40	8.40

Sausage Stuffers or FillersSee *Stuffers or Fillers, Sausage*.**Saw Frames—**See *Frames, Saw*.**Saw Sets—See sets, Saw.****Saw Tools—See Tools, Saw.****Saws—**

Atkins:	
Circular	45%
Band	50@50.10%
Butcher Saws	50%
Cross Cuts	35%
One-Man Cross Cut	40%
Narrow Cross Cut	35%
Hand, Rip and Panel	35.45%
Miter Box and Compass	40%
Mulay, Mill and Drag	45%
Wood Saws	40.10%
Chapin-Stephens Co.:	
Turning Saws and Frames	30@30.10%
Diamond Saw & Stamping Works:	
Sterling Kitchen Saws	30.10@10%
Diston's:	
Circular, Solid and Ins'ted Tooth	50%
Band, 2 to 18 in. wide	50%
Band, 1/4 to 1 1/2	50%
Crosscuts	45%
Narrow Crosscuts	50%
Mulay, Mill and Drag	45%
Framed Woodsaws	35%
Woodsaw Blades	25%
Woodsaw Rods, Tinned	15%
Hand Saws, Nos. 12, 99, 9, 16, d100	
Do, 120, 76, 77, 8	25%
Hand Saws, No. 7, 107, 107 1/2, 3, 1	
0, 0, Combination	35%
Compass, Key Hole, &c.	25%
Hand Ice Saws	45%
Butcher Saws and Blades	30%
C. E. Jennings & Co.'s:	
Back Saws	15%
Butcher Saws	25.47%
Compass and Key Hole Saws	35.47%
Framed Wood Saws	25.47%
Hand Saws	12%
Wood Saw Blades	35.47%
Millers Falls:	
Butcher Saws	15.10%
Star Saw Blades	15.10%
Massachusetts Saw Works:	
Victor Kitchen Saws	40.10@50%
Butcher Saws Blades	35.40%
Peace & Richardson's Hand Saws	30%
Simonds':	
Circular Saws	45%
Crescent Ground Cross Cut Saws	30%
One-Man Cross Cuts	40%
Gang Mill, Mulay and Drag Saws	45%
Hand Saws	50%
Back Saws	25.47%
Butcher Saws	35.47%
Hand Saws	25.47%
Hand Saws, Bay State Brand	25.47%
Compass, Key Hole, &c.	25.47%
Wood Saws	40.47%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws	50%

Hack Saw Blades and Frames—

Atkins' Hack Saw Blades A A A	25%
Diston's:	
Concave Blades	35%
Chromol Blades	35%
Hack Saw Frames	40%
Simonds', The Best	35%
Culley	30%
C. E. Jennings & Co.'s:	
Hack Saw Frames, Nos. 175, 180	40.47%
Hack Saws, Nos. 175, 180, complete	40.47%
Goodell's Hack Saw Blades	40.10%
Griffin's Hack Saw Frames	35.45@10%
Griffin's Hack Saw Blades	35.45@10%
Star Hack Saws and Blades	15.10%
Sterling Hack Saw Blades	30.10@5%
Sterling Power Hack Saw Machines	
each, No. 1, \$25.00; No. 2, \$30.00	10%
Victor Hack Saw Blades	30%
Victor Hack Saw Frames	40%
Whitaker Mfg. Co.:	
National Hand Blades, Hand	
Frames, Power Blades	40%

Scroll—

Barnes, No. 7, \$15	25%
Barnes' Scroll Saw Blades	40%
Barnes' Velocipede Power Scroll Saw	
without boring attachment	\$18
with boring attachment	\$25
Leater, complete	\$10.00
Rogers, complete	\$3.00 and \$4.00

Scales—

Union Platform, Plain	\$2.10 @ 2.20
Union Platform, Stpd.	\$2.80 @ 2.90
Challinor's:	
Eureka	25%
Favorite	40%
Grocers' Trip Scales	40%
The Standard R. R. and Wag.	40%

Scrapers—

Box, 1 Handle	doz. \$1.85 @ 2.10
Box, 2 Handle	doz. \$2.35 @ 2.50
Ship	Light, \$2.00; Heavy, \$1.50
Chapin-Stephens Co., Box	30.10@10%
Richards Mfg. Co., Foot	60%

Screws—Bench and Hand

Bench, Iron, doz. 1 in.	\$2.50 @ 2.75
1 1/2	\$3.00 @ 3.25
Bench, Wood	80.40 @ 80.10%
Hand, Wood	70.40 @ 70.10%
Chapin-Stephens Co., Hand	70.40 @ 70.10%

Coach, Lag and Hand Rail—	
Lag, Comp. Point	80.45%
Coach, Gimlet Point	80.45%
Hand Rail	70.40 @ 70.10%

Jack Screws—

Standard List	70.40 @ 70.10%
Millers Falls	50.10 @ 50.10%
Sweet Iron Works	70.40 @ 70.10%

Machine—

Cut Tread, Iron, Brass or

Bronze:

Flat Head or Round Head,

50.40 @ 50.10%

Fillister Head, 50.40 @ 50.10%

Rolled Thread, F. H. or R. H.,

Iron

F. H. or R. H., Brass, Nos.

8 to 14

65.10%

Set and Cap—

Set (Iron)

Set (Steel), net advance over

Iron

Sq. Hd. Cap

Hex. Hd. Cap

Rd. Hd. Cap

Fillister Hd. Cap

60.47%

Wood—

List July 23, 1903.

Flat Head, Iron

Round Head, Iron

Flat Head, Brass

Round Head, Brass

Flat Head, Bronze

Round Head, Bronze

Drive Screws

87.45%

Scroll Saws—

See *Saws, Scroll*.

Scythes—

Per doz.

Plain Grass, Cutting Edge Pol-

ished

Clipper, Bronzed Web

Solid Steel, Web and Backs Pol-

ished

Bush, Weed and Bramble

Painted

Grain, Painted, Cutting

Polished

Clipper Grain, Bronze Web

\$3.50 @ \$3.75

Seeders, Raisin—

Enterprise

25@30%

Sets—Awl and Tool—

Frey's Tool Handles, Nos. 1, \$12;

2, \$16; 3, \$12

Millers Falls Adj. Tool Handles, No.

1, \$12; No. 4, \$12; No. 5, \$18

20.10%

Garden Tool Sets—

American Fork & Hoe Co.

Rake, Shovel and Hoe, # doz. sets,

No. 3 P F

\$7.25

Sets, Nail—

Octagon

Buck Bros

Elmore Tool Mfg. Co.

Mayhew's

Snell's Corrugated, Cup Pt.

Snell's Knurled, Cup Pt.

Victor Knurled, Cup Pt.

\$7.50

Rivet—

Regular list

75@75.10%

Saw—

Atkins:

Criterion

Adjustable

Diston's Star, Monarch and Tri-

umph

Giant Royal Cross Cut

Morrill's No. 1

Nos. 3 and 4, Cross Cut

No. 5, Mill

Nos. 10, 11, 12

No. 1 Old Style

Special

Royal, Hand

Seymour Smith & Son's

Taintor Positive

\$16.25

Shaving—

Fox Shaving Sets, No. 30

doz., net

\$24.00

Smith & Hemenway Co.'s

\$75%

Sharpeners, Knife—

Pike Mfg. Co.:

Fast Cut Pocket Knife Hones

Mounted Kitchen Sand Stone

doz.

\$1.50

Natural Grit Carving Knife

Hones, # doz.

\$3.00

Quick Cut Emery Carving

Knife Hones, # doz.

\$1.50

Quick Edge Pocket Knife

Hones, # doz.

\$2.50

Skate—

Smith & Hemenway Co., Eureka

50%

Shaves, Spoke—

Iron

doz. \$1.25

Wood

doz. \$2.00

Chapin-Stephens Co.

30@30.10%

Goodell's

doz. \$9.00

15.10%

Seymour Smith & Son's

50%

Shears—

Cast Iron

7 8 9 in.

Best

\$16.00 18.00 20.00 gro.

Good

\$13.00 15.00 17.00 gro.

Cheap

\$5.00 6.00 7.00 gro.

Straight Trimmers, &c.

Best quality Jap.

70.40 @ 70.10%

Best Quality Nickel

60.40 @ 60.10%

Tailors' Shears

40.40 @ 40.10%

Acme Cast Shears

40.40 @ 40.10%

Columbian Cutlery Co.:

30.10 @ 30.10%

Grass

50.10 @ 50.10%

Horse or Mule

50.10 @ 50.10%

W. H. Compton Shear Co.:

Japan Handles, Nickel Blades

60.40 @ 60.10%

Full Nickel

50.10 @ 50.10%

Heinrich's Tailor's Shears

10%

National Cutlery Co.'s Nickel Plated

60.40 @ 60.10%

J. W. & Sons Co.:

Best Quality Jap'd

60.10 @ 60.10%

Best Quality Nickle'd

50.10 @ 50.10%

Tailors'

25%

Tinners' Snips—

Steel Blades

20.45 @ 20.10%

Steel Laid Blades

80.10 @ 80.10%

Acme Cast Snips

100.45 @ 100.45%

W. H. Compton Shear Co., Forged

Steel Handles

35%

Forged Handles, Steel Blades, Ber-	50%
lin	50%
Heinrich's Snips	40%
Jennings & Griffin Mfg. Co.'s 6 1/2 to	10 in.
National Cutlery Co.'s Forged Steel	50%
Niagara Snips	40%
P. S. & W. Forged Handles	25%
W. R. W.	50%
J. Wiss & Sons Co.:	
Wiss Forged Steel	25%

Pruning Shears—

Columbian Cutlery Co.:	
Hedge, Wilcut Brand	60.40 @ 60.10%
Lawn and Border, Wilcut Brand	60.40 @ 60.10%
W. H. Compton Shear Co., Dropped	35%
Forged Steel	35%
Cronk's Hand Shears	33.4%
Cronk's Wood Handle Shears	33.4%
Diston's Combined Pruning Hook	25%
and Saw, # doz.	\$18.00
Diston's Pruning Hook only, #	\$12.00
J. T. Henry Mfg. Co.:	
Pruning Shears, all grades	40%
P. S. & W. Co.	40.10%
Seymour Smith & Son's:	
Hand Shears	70%
Standard Tree Pruners	75.10%
Wood Handle Pruning Shears	40%

Sheaves—Sliding Door—

Reading

R. & E. list

40%

Sliding Shutter—

Reading list

R. & E. list

40%

Shells—Shells, Empty—

Brass Shells, Empty:

Climax, 10 and 12 gauge

Club, Rival, 6.45%; First Quality

Paper Shells, Empty:

New Rapid, 10, 12, 16 and 20 gauge

Climax, 10 and 12 gauge; Acme and

Magic, 10, 12, 16 and 20 gauge;

Ideal, 10, 12, 16 and 20 gauge;

Leader grade

Union, League, 10 and 12 gauge

New Climax, Denance, 10, 12, 14,

16 and 20 gauge; Climax, 14, 16

and 20 gauge; League, Union, 14, 16

and 20 gauge; Repeater Grade

Shells, Loaded—

Loaded with Black Powder

Loaded with Smokeless Powder,

medium grade

Loaded with Smokeless Powder,

high grade

New Club, Black Powders

Nitro Club, Smokeless Powders

Arrow, Smokeless Powders

Winchester:

Smokeless Repeater Grade

Smokeless Leader Grade

Black Powder

Shingles, Metal—Per Sq.

Edwards Mfg. Co.:

14 x 20

CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL— Bar Iron from store—	
Refined Iron:	
1 to 1½ in. round and square.....	\$ 1.70¢
1½ to 4 in. x ½ to 1 in.....	\$ 1.90¢
1½ to 4 in. x ½ to 3-16.....	\$ 1.90¢
Rods—½ and 11-16 round and square.....	\$ 1.90¢
Angles:	
3 in. x ½ in. and larger.....	1.95¢
3 in. x 3-16 in. and ½ in.....	2.15¢
1½ to 2½ in. x ½ in.....	1.95¢
1½ to 2½ in. x 3-16 in. and thicker.....	1.95¢
1 to 1½ in. x 3-16 in.....	2.00¢
1 to 1½ in. x ½ in.....	2.15¢
¾ x ½ in.....	2.25¢
¾ x ¾ in.....	3.30¢
¾ x 3-16 in.....	3.50¢
Tees:	
1 in.....	2.25¢
1½ in.....	2.05¢
1½ to 2½ in.....	1.90¢
3 in. and larger.....	2.05¢
Beams.....	2.00¢
Channels, 3 in. and larger.....	2.00¢
Bands—1½ to 6 x 3-16 to No. 8.....	2.05¢
"Burden's Best" Iron, base price.....	3.15¢
Burden's "H. B. & S." Iron, base price.....	2.95¢
Norway Bars.....	3.30¢

Merchant Steel from Store—	
Bessemer Machinery.....	per lb 1.70¢
Toe Calk, Tire and Sleigh Shoe.....	2.50 to 3.00¢
Best Cast Steel, base price in small lots.....	7¢

Sheets from Store— Black	
One Pass, C.R.	R. G.
Soft Steel	Cleaned.
No. 16.....	\$ 2.80¢
No. 18 to 21.....	\$ 2.85¢
No. 22 and 24.....	\$ 2.95¢
No. 26.....	\$ 3.10¢
No. 28.....	\$ 3.10¢

Russia, Planished, &c.	
Genuine Russia, according to assortment.....	\$ 11½¢ to 14¢
Patent Planished, W. Dewees Wood.....	\$ 10¢; B, 9¢ net.
Galvanized.	
No. 14 to 16.....	\$ 2.85¢
No. 22 to 24.....	\$ 3.20¢
No. 26.....	\$ 3.40¢
No. 28.....	\$ 3.75¢
No. 20 and lighter 36 inches wide, 25¢ higher.	

Genuine Iron Sheets— Galvanized.	
Nos. 22 and 24.....	\$.575¢
No. 26.....	\$.625¢
No. 28.....	\$.725¢

Corrugated Roofing—	
2½ in. corrugated.....	Painted Galvd.
No. 24.....	\$ 100 sq. ft. \$3.90 4.75
No. 26.....	\$ 100 sq. ft. 2.90 3.95
No. 28.....	\$ 100 sq. ft. 2.55 3.70

Tin Plates— American Charcoal Plates (per box.)	
"A. A. A." Charcoal:	
IC, 14 x 20.....	\$6.15
IX, 14 x 20.....	7.40

A. Charcoal:	
IC, 14 x 20.....	\$5.30
IX, 14 x 20.....	6.30

American Coke Plates—Bessemer—	
IC, 14 x 20.....	107 lb \$4.20
IX, 14 x 20.....	5.50

American Terne Plates—	
IC, 20 x 28 with an 8 lb. coating.....	\$8.10
IX, 20 x 28 with an 8 lb. coating.....	10.00

Seamless Brass Tubes—	
List December 4, 1905.....	Base price 18¢

Brass Tubes, Iron Pipe Sizes—	
List December 4, 1905.....	Base price 18¢

Copper Tubes—	
List December 4, 1905.....	Base price 22¢

Braze Brass Tubes—	
List August 1, 1908.....	20½¢ per lb

High Brass Rods—	
List August 1, 1908.....	14½¢ per lb

Roll and Sheet Brass—	
List August 1, 1908.....	14¢ per lb

Brass Wire—	
List August 1, 1908.....	14½¢ per lb

Copper Wire—	
Base Price, Carload lots mill 14½¢	

METALS—	
Tin—	
Straits Fig.....	\$ 30½¢ to 31½¢

Copper—	
Lake Ingot.....	\$ 134¢ to 14¢
Electrolytic.....	\$ 134¢ to 13½¢
Casting.....	\$ 134¢ to 13½¢
Sheet Copper Hot Rolled, 16 oz (quantity lots).....	\$ 164¢
Sheet Copper Cold Rolled, 1¢ per lb advance over Hot Rolled.....	
Sheet Copper Polished 2½ in. wide and under, 1¢ advance over Cold Rolled.....	
Sheet Copper Polished over 20 in. wide, 2¢ advance over Cold Rolled.....	
Planished Copper, 1¢ per lb more than Polished.....	

Spelter—	
Western.....	\$ 5½¢ to 6¢

Zinc.	
No. 9, base, casks, 7.25¢ per lb Open.....	\$ 7.75¢

Lead.	
American Fig.....	\$ 4½¢ to 4¾¢
Bar.....	\$ 5½¢ to 5¾¢

Soldier.	
1½ & ½, guaranteed.....	\$ 20 to 20½¢
No. 1.....	\$ 17½¢ to 17¾¢
Refined.....	\$ 15½¢ to 15¾¢

Prices of Solder indicated by private brand vary according to composition.

Antimony—	
Cookson.....	\$ 10¢
Halletts.....	\$ 9½¢
Other Brands.....	\$ 9¢

Bismuth—	
Per. lb.....	\$ 1.90 to \$2.00

Aluminum—	
No. 1 Aluminum (guaranteed over 99½% pure), in ingot for remelting.....	\$ 34¢
Rods & Wire.....	Base Price 33¢
Sheets.....	Base Price 34¢

Old Metals.	
Dealers' Purchasing Prices Paid in New York	

Copper, Heavy cut and crucible.....	
Copper, Heavy and Wire.....	\$ 11.25 to 11.50
Copper, Light and Bottoms.....	\$ 9.75 to 10.00
Brass, Heavy.....	\$ 7.75 to 8.00
Brass, Light.....	\$ 6.00 to 6.25
Heavy Machine Composition.....	\$ 10.00 to 10.25
Clean Brass Turnings.....	\$ 7.25 to 7.50
Composition Turnings.....	\$ 8.00 to 8.5
Lead, Heavy.....	\$ 3.50 to 3.75
Lead, Test.....	\$ 3.25 to 3.50
Zinc Scrap.....	\$ 3.50

THE IRON AGE

The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.

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